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VOLUME 20 / NUMBER 21
NOVEMBER 8, 1982
ACC. NOS. N82-30282 TO N82-31292

STAR

AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

PRODUCED BY THE
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Scientific and Technical Aerospace Reports, Volume 20, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through **February 28, 1985**.

US ISSN 0036-8741

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For related information see also *34 Fluid Mechanics and Heat Transfer*

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85 URBAN TECHNOLOGY AND TRANSPORTATION **3058**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **3058**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **3075**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **3075**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **3075**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **3076**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL **3076**

Note: N.A. means that no abstracts were assigned to this category for this issue.

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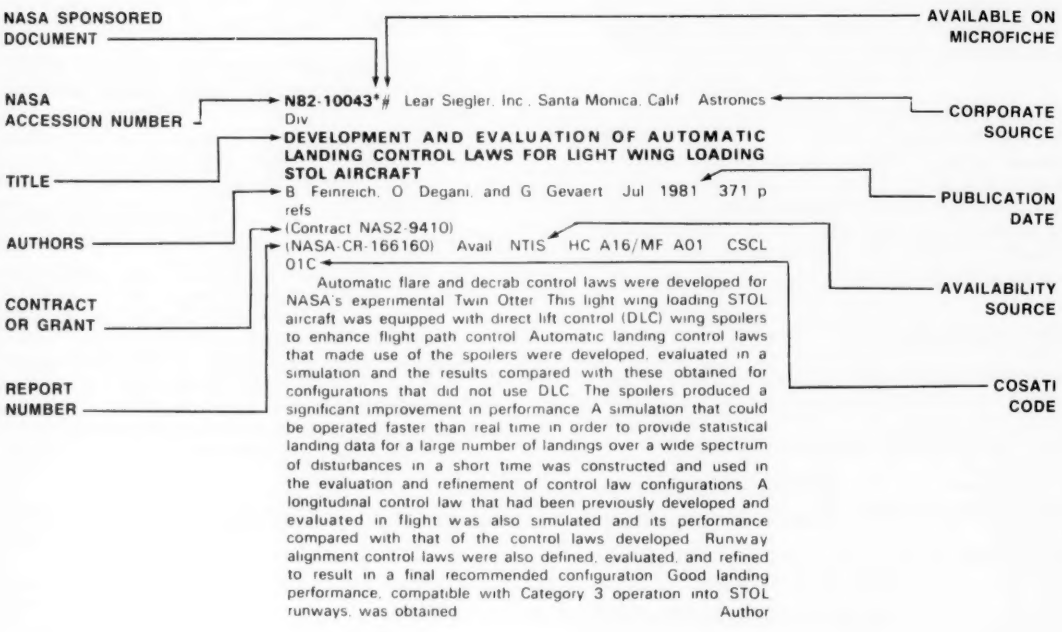
TYPICAL CITATION AND ABSTRACT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NASA ACCESSION NUMBER
N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div
CORPORATE SOURCE
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
TITLE
B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
PUBLICATION DATE
AUTHORS
(Contract NAS2-9410)
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C
AVAILABILITY SOURCE
CONTRACT OR GRANT
Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author
COSATI CODE
REPORT NUMBER

VOLUME 20 NUMBER 21 NOVEMBER 8, 1982

Scientific and Technical Aerospace Reports

01 AERONAUTICS (GENERAL)

N82-30282* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING. A CONTINUING BIBLIOGRAPHY (SUPPLEMENT 149)
Jun. 1982 122 p
(NASA-SP-7037(149); NAS 1.21:7037(149)) Avail: NTIS HC A06/MF A01 CSCL 01A

This bibliography lists 418 reports, articles and other documents introduced into the NASA scientific and technical information system in May 1982. Author

N82-30283*# National Aeronautics and Space Administration, Washington, D. C.
NASA AERONAUTICS
David A. Anderson [1982] 30 p Original contains color illustrations
(NASA-EP-85; NAS 1.19:85) Avail: NTIS MF A01; SOD HC $2.50 as 033-000-00796-5 CSCL 01B

Aeronautical research programs are discussed in relation to research methods and the status of the programs. The energy efficient aircraft, STOL aircraft and general aviation aircraft are considered. Aerodynamic concepts, rotary wing aircrft, aircraft safety, noise reduction, and aircraft configurations are among the topics included. S.L.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-30284*# National Aeronautics and Space Administration Washington, D. C.
INFLUENCE OF THE REYNOLDS NUMBER ON NORMAL FORCES OF SLENDER BODIES OF REVOLUTION
Klaus Hartmann May 1982 31 p refs Transl. into ENGLISH from Z. Flugwiss. Weltraumforsch. (West Germany), v. 2, no. 1, 178 p 22-35 Original language document announced as A79-29337 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76710; NAS 1.15:76710) Avail: NTIS HC A03/MF A01 CSCL 01A

Comprehensive force, moment, and pressure distribution measurements as well as flow visualization experiments were carried out to determine the influence of the Reynolds number on nonlinear normal forces of slender bodies of revolution. Experiments were performed in transonic wind tunnels at angles of attack up to 90 deg in the Mach number range 0.5 to 2.2 at variable Reynolds numbers. The results were analysed theoretically and an empirical theory was developed which describes the test results satisfactory. M.G.

N82-30285*# National Aeronautics and Space Administration, Washington, D. C.
COMPUTATION OF SUBSONIC FLOW AROUND AIRFOIL SYSTEMS WITH MULTIPLE SEPARATION
Klaus Jacob Jun. 1982 61 p refs Transl. into ENGLISH of "Berechnung von Profilsystemen bei Unterschallstromung mit Mehrfacher Ablosung" rept. DFVLR-FB-81-24. Goettingen, West Germany, 1981 63 p Translation was announced as N82-140550 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Inst. fuer Theoretische Stromungsmechanik, DFVLR, Goettingen, West Germany
(Contract NASw-3542)
(NASA-TM-76930; NAS 1.15:76930; DFVLR-FB-81-24) Avail: NTIS HC A04/MF A01 CSCL 01A

A numerical method for computing the subsonic flow around multi-element airfoil systems was developed, allowing for flow separation at one or more elements. Besides multiple rear separation also sort bubbles on the upper surface and cove bubbles can approximately be taken into account. Also, compressibility effects for pure subsonic flow are approximately accounted for. After presentation the method is applied to several examples and improved in some details. Finally, the present limitations and desirable extensions are discussed. Author

N82-30286*# National Aeronautics and Space Administration, Washington, D. C.
MULTIDOMAIN APPROACH FOR CALCULATING COMPRESSIBLE FLOWS
L. Cambier, W. Chazzi, J. P. Veuillot, and H. Viviand Apr. 1982 41 p refs Transl. into ENGLISH of the mono. "Une approche par domaines pour le calcul d'ecoulements compressibles" (France), 1981 p 1-24 Presented at the 5th Intern. Colloq. on Methods of Sci. and Tech. Calculation, Versailles, 14-18 Dec. 1981 Original language document announced as A82-21187 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76692; NAS 1.15:76692) Avail: NTIS HC A03/MF A01 CSCL 01A

A multidomain approach for calculating compressible flows by using unsteady or pseudo-unsteady methods is presented. This approach is based on a general technique of connecting together two domains in which hyperbolic systems (that may differ) are solved with the aid of compatibility relations associated with these systems. Some examples of this approach's application to calculating transonic flows in ideal fluids are shown, particularly the adjustment of shock waves. The approach is then applied to treating a shock/boundary layer interaction problem in a transonic channel. M.G.

N82-30287*# National Aeronautics and Space Administration, Washington, D. C.
AERODYNAMICS ON A TRANSPORT AIRCRAFT TYPE WING-BODY MODEL
V. Schmitt May 1982 30 p refs Transl. into ENGLISH of "Aerodynamique dun ensemble voilure-fuselage du type 'avion

de transport" (France), no. ONERA-TP-1981-122, 1981 p 1-23 Presented at the 18th Colloq. on Appl. Aerodyn. of AAAF, Poiteriers, France, 18-20 Nov. 1981 Original document announced as A82-19738 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76878; NAS 1.15:76878) Avail: NTIS HC A03/MF A01 CSCL 01A

The DFLR-F4 wing-body combination is studied. The 1/38 model is formed by a 9.5 aspect ratio transonic wing and an Airbus A 310 fuselage. The F4 wing geometrical characteristics are described and the main experimental results obtained in the S2MA wind tunnel are discussed. Both wing-fuselage interferences and viscous effects, which are important on the wing due to a high rear loading, are investigated by performing 3D calculations. An attempt is made to find their limitations. S.L.

N82-30288*# Oklahoma State Univ., Stillwater. Dept. of Mechanical Engineering.
FLOW AND ACOUSTIC PROPERTIES OF LOW REYNOLDS NUMBER UNDEREXPANDED SUPERSONIC JETS Ph.D. Thesis
Tieh-Feng Hu 1977 146 p refs
(Contracts NAG1-159; NAG1-10)
(NASA-CR-169257; NAS 1.26:169257) Avail: NTIS HC A07/MF A01 CSCL 01A

Jet noise on underexpanded supersonic jets are studied with emphasis on determining the role played by large scale organized flow fluctuations in the flow and acoustic processes. The experimental conditions of the study were chosen as low Reynolds number (Re = 8,000) Mach 1.4 and 2.1, and moderate Reynolds number (Re = 68,000) Mach 1.6 underexpanded supersonic jets exhausting from convergent nozzles. At these chosen conditions, detailed experimental measurements were performed to improve the understanding of the flow and acoustic properties of underexpanded supersonic jets. S.L.

N82-30289*# Systems Technology, Inc., Hawthorne, Calif.
STABILITY AND CONTROL OF THE GOSSAMER HUMAN POWERED AIRCRAFT BY ANALYSIS AND FLIGHT TEST Final Report, Jan. 1980 - Dec. 1981
Henry R. Jex Jan. 1982 82 p refs Prepared for AeroVironment, Inc.
(Contract NAS4-2705)
(NASA-CR-163119; NAS 1.26:163119; STI-TR-2109-1; AV-R-82/520) Avail: NTIS HC A05/MF A01 CSCL 01A

A solar cell electric-powered aircraft was investigated in relation to performance, stability and control. The performance properties, such as lift to drag, power required, propeller efficiency, and trim speed effects were studied. The dynamic response properties to various control inputs to verify the computed stability and control characteristics were also investigated. S.L.

N82-30290*# National Aeronautics and Space Administration, Washington, D. C.
FLOW AND PRESSURE FIELD OF A MODEL PROPELLER
Rudolf Neubauer and Klaus-Peter Anders Feb. 1982 12 p refs Transl. into ENGLISH of "Stromungs und Druckfeld eines Modellpropellers" West Germany, 1977 8 p Presented at the 10th Jahrestagung, West Berlin, 13-15 Sep. 1977 Original language document announced as A78-24451 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by DFVLR, Brunswick
(Contract NASw-3542)
(NASA-TM-76690; NAS 1.15:76690) Avail: NTIS HC A02/MF A01 CSCL 01A

To examine the problem of noise reduction of propeller aircraft, a disturbance free method is presented for visualization of pressure gradients and flows by means of a Schlieren configuration. The flow and pressure field of a model propeller was represented using a running film. Aspects of Schlieren and model technology are commented on. Author

N82-30291*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AEROPROPULSIVE CHARACTERISTICS OF MACH NUMBERS UP TO 2.2 OF AXISYMMETRIC AND NON-AXISYMMETRIC NOZZLES INSTALLED ON AN F-18 MODEL
Francis J. Capone Aug. 1982 80 p refs
(NASA-TP-2044; L-15208; NAS 1.60:2044) Avail: NTIS HC A05/MF A01 CSCL 01A

An investigation to determine the aeropropulsive characteristics of nonaxisymmetric nozzles on an F-18 jet effects model was conducted in the Langley 16-foot transonic tunnel and the AEDC 16-foot supersonic wind tunnel. The performance of a two dimensional convergent-divergent nozzle, a single expansion ramp nozzle, and a wedge nozzle was compared with that of the baseline axisymmetric nozzle. Test data were obtained at static conditions and at Mach numbers from 0.60 to 2.20 at an angle of attack of 0 deg. Nozzle pressure ratio was varied from jet-off to about 20. Author

N82-30292# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
VISCOUS-INVISCID INTERACTIONS OVER TRANSONIC TANGENTIALLY BLOWN AIRFOILS Final Report, 16 Feb. 1981 - 15 Feb. 1982
N. D. Malmuth, W. D. Murphy, and J. D. Cole Apr. 1982 74 p refs
(Contract N00014-81-C-0104)
(AD-A114942; SC5296.1FR) Avail: NTIS HC A04/MF A01 CSCL 01/3

A viscous interaction model has been developed for the treatment of tangentially blown transonic airfoils. The coupling procedure employs a small disturbance approximation for the nearly inviscid outer flow and interacts this region with the boundary layer, wall jets, and propulsive wake. Keller's box scheme is utilized to treat these viscous zones. On the basis of parametric studies for laminar flow, the skin friction drag appears to increase nearly linearly with the blowing coefficient CJ for a fixed Mach number-incidence combination, giving a substantial scrubbing drag penalty for overblowing beyond the CJ necessary to achieve attached flow. Increases in wave drag over the same range of CJ are much smaller. Associated supercirculation gains with overblowing are inefficient from the standpoint of L/D due to the large values of scrubbing drag. The role of surface skin friction in modifying the viscous cambering of the airfoil in the laminar case is compared to a turbulent modification of the coupling model. Whereas the laminar results show a lift increase associated with the cambering action of the wall jets, the turbulent solutions indicate a decambering effect resulting in decreased lift. Also evident with the turbulent results are increased skin friction and wave drag. A explanation of these trends in terms of the Karman momentum equation is given.
Author (GRA)

N82-30293# Naval Surface Weapons Center, White Oak, Md.
EFFECTS OF CANOPY GEOMETRY AND CLOTH PERMEABILITY ON THE DRAG COEFFICIENT OF A CROSS PARACHUTE IN THE FULLY OPEN AND REEFED CONDITIONS FOR A W/A RATIO OF 0.3 Final Report, FY 1981
W. P. Ludtke 1 Feb. 1982 77 p
(AD-A115046; AD-F500030; NSWC/TR-81-441) Avail: NTIS HC A05/MF A01 CSCL 01/3

This report describes a series of wind-tunnel tests on the cross-type parachute to investigate the effects of cloth permeability, number of suspension lines, and suspension line length in the fully opened and reefed conditions. Forty-inch-diameter models with a canopy arm width-to-length ratio (W/L) of 0.3 were tested at various velocities from 50 fps to 293 fps in the fully inflated state. Results of these tests demonstrate that the parachute geometry and cloth permeability do have an effect on the drag capability of the cross parachute. Additional tests of reefed configurations for several reefing line lengths-to-canopy-diameter ratios from 0.6 to 1.6 at a constant velocity of 203 fps established the reefed characteristics of this parachute. The steady state forces in the reefing line were measured by use of strain gage links. Data are presented in tabular and graphical format. Photographs of representative canopy shapes are included for illustration. GRA

N82-30294# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ACTA MECHANICA SINICA (SELECTED ARTICLES)
4 May 1982 77 p refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 5, 1981 p 421-438, 445-451, 507-510

and 516-520
(AD-A115388; FTD-ID(RS)T-1759-81) Avail: NTIS HC A05/MF A01 CSCL 20/4

Variational and generalized principles for three-dimensional transonic low with shock waves in a rotating turbo-impeller are discussed. Circulation for a three-dimensional turbulent boundary layer on a yawed wing in compressible flow is discussed. The Rayleigh-Taylor instability of a current sheet in an electromagnetically driven shock wave apparatus is considered. Measurement of electron density behind a strong shock wave using a 3 cm microwave transmission is reviewed. The interference factor of vortex lift of wing-body combinations at supersonic speed is also reviewed. Author

N82-30295# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE NUMERICAL SOLUTION OF MACH-ZEHNDER INTERFEROGRAM ANALYSIS OF SUPERSONIC AIRFLOW ABOUT CYLINDRICAL AND SYMMETRICAL PROJECTILES

Peizhu Ding and Shoufu Pan 28 Apr. 1982 19 p refs Transl. into ENGLISH from Acta Sci. Natur. Univ. Julinensis (China), no. 3, 1981 p 60-71
(AD-A115387; FTD-ID(RS)T-0016-82) Avail: NTIS HC A02/MF A01 CSCL 20/4

Physical and numerical conclusions concerning the Abel transformation in plasma spectroscopy were extended to the Mach-Zehnder interferogram analysis in supersonic airflow abort cylindrica symmetrical projectiles. Three physical solutions regarding the relation between the interferometric fringe shift and the concentration variation obtained at each point of the supersonic airflow field were obtained. Author

N82-30296# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Entwurfsaerodynamik.

WIND TUNNEL INVESTIGATIONS ON THIN SUPERCRITICAL AIRFOILS IN HIGH SUBSONIC FLOW

Horst Koerner and Wolfgang Puffert-Meissner Feb. 1982 63 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-774)
(DFVLR-FB-82-06; ESA-TT-774) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 19,30

Four thin airfoils (t/c = 0.05) were investigated experimentally. The aerodynamic efficiency of three supercritical airfoils is compared with that of a conventional one. The investigation was conducted in a transonic wind tunnel within a Mach number range of 0.6 to 0.95 and at Reynolds numbers 4 million to 6 million. Results show the superiority of supercritical airfoil design. This is explained, referring to overall aerodynamic coefficients, limits of efficiency, and in special cases to pressure distributions. Author (ESA)

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

N82-30297*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

AIRCRAFT ICING RESEARCH AT NASA

J. J. Reinmann, R. J. Shaw, and W. A. Olsen, Jr. 1982 17 p refs Presented at the 1st Intern. Workshop on Atmospheric Icing of Struct., Hanover, N.H., 1-3 Jun. 1982
(NASA-TM-82919; E-1307; NAS 1.15:82919) Avail: NTIS HC A02/MF A01 CSCL 01C

Research activity is described for: ice protection systems, icing instrumentation, experimental methods, analytical modeling for the above, and in flight research. The renewed interest in aircraft icing has come about because of the new need for All-Weather Helicopters and General Aviation aircraft. Because of increased fuel costs, tomorrow's Commercial Transport aircraft will also require new types of ice protection systems and better estimates of the aeropenalties caused by ice on unprotected surfaces. The physics of aircraft icing is very similar to the icing that occurs on ground structures and structures at sea; all involve droplets that freeze on the surfaces because of the cold air. Therefore all icing research groups will benefit greatly by sharing their research information. Author

N82-30298*# Dayton Univ., Ohio. Research Inst.

AERODYNAMIC PENALTIES OF HEAVY RAIN ON A LANDING AIRCRAFT Final Report

Patrick A. Haines and James K. Luers Jul. 1982 72 p refs (Grant NsG-6026)
(NASA-CR-156885; NAS 1.26:156885; UDR-TR-82-26) Avail: NTIS HC A04/MF A01 CSCL 01C

The aerodynamic penalties of very heavy rain on landing aircraft were investigated. Based on severity and frequency of occurrence, the rainfall rates of 100 mm/hr, 500 mm/hr, and 2000 mm/hr were designated, respectively, as heavy, severe, and incredible. The overall and local collection efficiencies of an aircraft encountering these rains were calculated. The analysis was based on raindrop trajectories in potential flow about an aircraft. All raindrops impinging on the aircraft are assumed to take on its speed. The momentum loss from the rain impact was later used in a landing simulation program. The local collection efficiency was used in estimating the aerodynamic roughness of an aircraft in heavy rain. The drag increase from this roughness was calculated. A number of landing simulations under a fixed stick assumption were done. Serious landing shortfalls were found for either momentum or drag penalties and especially large shortfalls for the combination of both. The latter shortfalls are comparable to those found for severe wind shear conditions. Author

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications*.

N82-30299# Royal Aircraft Establishment, Farnborough (England). Radio and Navigation Dept.

FLIGHT TRIALS OF THE LITTON LTN-211 OMEGA NAVIGATION SYSTEM IN A WESSEX HELICOPTER

I. D. Birch Jan. 1981 20 p refs
(RAE-TM-RAD-NAV-147; BR78250) Avail: NTIS HC A02/MF A01

The Litton LTN-211 Omega Navigation System is currently in service in RAF transport and other aircraft. Installation and flight trials of the Omega equipment in a Wessex helicopter are described. Author

N82-30300# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.

GRAVITY GRADIOMETER SURVEY AND REAL TIME TECHNIQUES FOR IMPROVING INERTIAL NAVIGATION SYSTEM ACCURACY Final Report, Jan. 1978 - Dec. 1981

Daniel B. DeBra, John V. Breakwell, and Eugene Wells Dec. 1981 136 p refs
(Contract F19628-78-C-0038; AF Proj. 3201)
(AD-A114636; AFGL-TR-82-0021) Avail: NTIS HC A07/MF A01 CSCL 17/7

As inertial navigation instrumentation becomes more advanced, errors associated with imprecise knowledge of the true gravity vector become significant. With the development of the moving base gravity gradiometer, a means for detecting the true gravity vector is available. This research explores both real time and a priori schemes for using gradiometer information to reduce the position and velocity error associated with an inertial navigation system. In the real time application, information derived from the gradiometer is filtered to produce estimates of position and velocity error. The problem is to derive accurate filters in

the presence of an inherently transcendental gravity field. Conventional Kalman filters are cumbersome to apply in this instance. However, the sensitivity of inertial navigation systems at Schuler frequency makes it possible to neglect errors outside of a narrow band of frequencies centered at Schuler frequency. This approximation leads to low order filters which may be applied with surprising accuracy. For the survey application, the gradiometer is used to establish a reference gravity model to be used in open loop inertial navigation system operation. By determining the root mean squared values of the resulting position and velocity errors. It is possible to evaluate the effectiveness of the survey scheme and to compare the survey application with the real time gradiometer application. Analytic and numeric covariance methods are used again to do these analyses. GRA

N82-30301# Naval Surface Weapons Center, Dahlgren, Va.
SIMULTANEOUS OBSERVATIONS OF GLOBAL POSITIONING SYSTEM (GPS) SATELLITES WITH TWO NAVSTAR GEODETIC RECEIVER SYSTEMS (NGRSs) Final Report
Bruce R. Hermann and Alan G. Evans Mar. 1982 32 p refs
(AD-A115390; NSWC/TR-81-472) Avail: NTIS HC A03/MF A01 CSCL 17/7

Two conventional code tracking Global Positioning System (GPS) receiver systems were used to simultaneously track GPS satellites on a short baseline. Six-second pseudorange observations and range differences from 1-min Doppler counts at a single frequency were obtained from each receiver. Relative positioning of the receiver antennas was conducted over zero-length and 2-m baselines. Common and independent frequency standards were used on different days; the results were compared.
Author (GRA)

N82-30302# Litton Systems, Inc., Woodland Hills, Calif. Guidance and Control Systems Div.
NUCLEAR MOMENT ALIGNMENT, RELAXATION AND DETECTION MECHANISMS Final Report, Feb. 1977 - Jan. 1982
A. T. Nicol Feb. 1982 116 p refs
(Contract F49620-77-C-0047; AF Proj. 2301)
(AD-A115203; Rept-404720; AFOSR-82-0418TR) Avail: NTIS HC A06/MF A01 CSCL 17/7

The reported physics research is part of an overall program to develop a nuclear magnetic resonance gyro that makes use of an optically pumped alkali metal vapor both to align the magnetic moments of the noble gas nuclei and to detect the weak magnetic fields that are generated by these precessing nuclear moments. Experiments designed to hold constant the rubidium vapor density in an NMR sample cell and thus restrict the spin exchange interaction while varying the cell wall temperature are reported. These experiments lead to longer relaxation times and larger signal amplitudes for the noble gas isotopes at elevated wall temperatures than is observed in the case where alkali metal vapor density is not restricted. (129)Xe magnetic resonance frequency shift experiments are reported in which the transverse relaxation times are found to depend strongly on choice of polarizer, pump light intensity, and alkali vapor density. The results are explained in terms of internally generated field gradients due to spacially non-uniform rubidium polarization across the sample cell. An analytical discussion of the temperature sensitivity of the NMR gyro bias due to quadrupolar frequency shift in (131)Xe is presented. That frequence shift is demonstrated to be a mechanism for the temperature dependence of the gyro bias and the temperature turning point (temperature at which temperature sensitivity of gyro bias becomes zero). Studies of Corning 1720 glass NMR cells, both rubidium hydride coated and non coated, are presented and compared with results for similarly prepared Pyrex cells. Hydride coated cells of both types are found to exhibit similar properties. GRA

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.
For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-30303*# National Aeronautics and Space Administration, Washington, D. C.
GROB AIRCRAFT CONSTRUCTION: THE G 110 FLIES
B. Malzbender Jun. 1982 15 p Transl. into ENGLISH from Aerokurier (West Germany), no. 3, 1982 p 262-264 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76893; NAS 1.15:76893) Avail: NTIS HC A02/MF A01 CSCL 01C

Description, specifications and test flight performance of the G 110 are provided. The G 110 completely incorporates modern GfK construction techniques which heretofore have been developed and perfected for the construction of sailplanes. The G 110 is a prototype of a GfK constructed motorized aircraft and shows much promise for the future of German aviation.
Author

N82-30304# School of Aerospace Medicine, Brooks AFB, Tex.
HUMAN-FACTORS EVALUATION OF C-141 FUEL SAVINGS ADVISORY SYSTEM Final Report, Dec. 1979 - Feb. 1981
Layne P. Perelli Dec. 1981 33 p refs
(AF Proj. 7930)
(AD-A114931; SAM-TR-81-37) Avail: NTIS HC A03/MF A01 CSCL 01/3

The Air Force installed a Fuel Savings Advisory System (FSAS) in three C-141 aircraft and performed an operational test and evaluation. At the request of the USAF Airlift Center, observers from the USAF School of Aerospace Medicine evaluated human-engineering, workload, and fatigue aspects of FSAS during three long-duration missions. Pilot's subjective fatigue/workload reports, interviews with crewman, and human-engineering analyses indicated that the FSAS was satisfactory for use in MAC airlift operations. Human-engineering solutions are provided, also suggestions for future improvement of the FSAS.
Author (GRA)

N82-30305# Naval Air Engineering Center, Lakehurst, N.J. Advanced Technology Office.
APPLICATION OF WEAR DEBRIS ANALYSIS TO AIRCRAFT HYDRAULIC SYSTEMS
P. V. Ciekurs and S. A. Ropar (Rockwell International Corp., Columbus, Ohio) 10 May 1982 23 p refs
(WF41461000)
(AD-A115060; NAEC-92-158) Avail: NTIS HC A02/MF A01 CSCL 13/7

This report documents an investigation into the feasibility of applying wear debris analysis methods as a maintenance tool for aircraft hydraulic systems. A breadboard was designed and operated, fluid samples were analyzed and trended. No relevant failures were experienced and limited conclusions reached. Recommendations are made for further investigations.
Author (GRA)

N82-30840*# Systems Technology, Inc., Mountain View, Calif.
TRAINING AIRCRAFT DESIGN CONSIDERATIONS BASED ON THE SUCCESSIVE ORGANIZATION OF PERCEPTION IN MANUAL CONTROL
Robert K. Heffley, Warren F. Clement, and Samuel J. Craig (Vought Corp., Hawthorne, Calif.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 119-127 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 01C

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

N82-30306# Honeywell, Inc., Minneapolis, Minn. Avionics Div.

ASSESSMENT OF STEREOGRAPHICS FOR FIRE CONTROL AND NAVIGATION IN FIGHTER AIRCRAFT Final Report, 1 Aug. 1980 - 30 Nov. 1981

Jeffrey M. Setterholm, S. Joy Mountford, and Paul N. Turner Wright-Patterson AFB, Ohio AFWAL Mar. 1982 95 p

(Contract F33615-80-C-3602; AF Proj. 2403)

(AD-A115414; AVD-TAS-3D-81-D02; AFWAL-TR-82-3008) Avail: NTIS HC A05/MF A01 CSCL 14/5

Integration of dual helmet-mounted displays, a helmet-attitude tracking device, a six-degree of freedom fighter aircraft digital simulation and dynamic stereo-pair computer graphics line drawings permitted overlaying 3-D (stereo) information on a pilot's view of the world. Display content for weapon delivery and 4-D navigation was investigated. A second display medium using a forward projection, TV, and PLZT goggles was incorporated to aid in the training process. This report documents what was learned in developing and evaluating the displays. Author (GRA)

N82-30307# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

DESIGN AND IMPLEMENTATION OF USAF AVIONICS INTEGRATION SUPPORT FACILITIES M.S. Thesis

Jon G. Hanson Dec. 1981 337 p refs

(AD-A115537; AFIT/GCS/EE/81D-10) Avail: NTIS HC A15/MF A01 CSCL 01/3

The design and implementation of avionic software support facilities known as Avionic Integration Support Facilities (AISFs) are investigated. A complete set of AISF functional requirements is presented in Data Flow Diagram format. This method of presentation facilitated the hierarchical development of the functional requirements. From these functional requirements an implementation model for such a facility is developed. The modeling vehicle used is Softech's Structured Analysis and Design Technique (SADT). The SADT model depicts inputs, outputs, processes, controls, and the mechanisms required to implement the AISF. Author (GRA)

N82-30857*# Systems Technology, Inc., Mountain View, Calif.

APPLICATION OF A PILOT CONTROL STRATEGY IDENTIFICATION TECHNIQUE TO A JOINT FAA/NASA GROUND BASED SIMULATION OF HEAD UP DISPLAYS FOR CTOL AIRCRAFT

Wayne F. Jewell *In* MIT Proc. of the 16th Ann Conf. on Manual Control 1980 p 395-409 refs (For primary document see N82-30833 21-51)

(Contracts NAS2-10385; DOT-FA77WAI-725; NASA-NMI-1052.151)

Avail: NTIS HC A99/MF A01 CSCL 01D

N82-30859*# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.

DESIGN, SIMULATION AND EVALUATION OF ADVANCED DISPLAY CONCEPTS FOR THE F-16 CONTROL CONFIGURED VEHICLE

Robert W. Klein (Grumman Aerospace Corp., Bethpage, N.Y.) and Walter M. Hollister *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 424-438 refs (For primary document see N82-30833 21-51)

(Grant AF-AFOSR-3260-78)

Avail: NTIS HC A99/MF A01 CSCL 01D

N82-30860*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SEPARATION MONITORING WITH FOUR TYPES OF PREDICTORS ON A COCKPIT DISPLAY OF TRAFFIC INFORMATION

Sharon Jago and Everett Palmer *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 439-447 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 01D

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-30308# Naval Postgraduate School, Monterey, Calif.

A PRELIMINARY ANALYSIS OF TF34-100/400 JET ENGINE REWORK DATA IN SUPPORT OF THE MRP SYSTEM IMPLEMENTATION AT NARF ALAMEDA M.S. Thesis

Ernest R. Slaybaugh Dec. 1981 83 p refs

(AD-A114452) Avail: NTIS HC A05/MF A01 CSCL 15/5

The Naval Air Rework Facility (NARF) located at Naval Air Station (NAS) Alameda is in the process of implementing a Material Requirements Planning (MRP) system which will incorporate an inventory model to help manage those repair parts which are not always replaced during component rework. This thesis focused on analyzing TF34-100/400 jet engine rework data as one phase of that implementation. In particular, probability of replacement values were generated for the repair parts from demand data and the rework schedule during 1980, and the engine's bill of materials. In addition, a parametric analysis was conducted to study the optimal relationship between the shortage and surplus costs of the proposed inventory model for the TF34 repair parts. The analyses highlighted the importance of determining the actual shortage costs resulting from a work stoppage and suggested some potentially useful forms for the surplus cost parameter. Author (GRA)

N82-30309# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.

FULL-AUTHORITY FAULT-TOLERANT ELECTRONIC ENGINE CONTROL SYSTEMS FOR VARIABLE CYCLE ENGINES Final Report, Aug. 1979 - Sep. 1981

Michael E. McGlone, William J. Davies, R. J. Miller, T. Basil Smith, J. H. Lala, and William C. Peck Wright-Patterson AFB, Ohio AFWAL Dec. 1981 259 p Prepared in cooperation with Draper (Charles Stark) Labs., Boston and Hamilton Standard, Windsor Locks, Conn.

(Contract F33615-79-C-2082; AF Proj. 3066)

(AD-A115289; PWA-FR-15054; AFWAL-TR-81-2121) Avail: NTIS HC A12/MF A01 CSCL 21/5

This Full Authority Fault Tolerant Electronic Engine Control program (FAFTEEC) was performed under Contract F33615-79-C-2082. The program was a 25-month study to develop design guidance for utilizing redundancy to provide control system architectures capable of very high levels of reliability. The study configured several such systems and evaluated the reliability, cost-of-ownership, weight and implementation. Conclusions of this program were that FAFTEEC goals are obtainable through redundancy and that the resulting system can be obtained at a reasonable cost and weight through dual system advanced technology. Analysis provided by the FAFTEEC allows for the following conclusions to be reached: FAFTEEC goals are reasonable, Redundant systems are required, Single string technology is not cost and weight effective, Coverage of dual systems is extremely important, Coverage via software is complex, costly and will not provide 100 percent coverage, and Dual system technology must be included throughout all system components. Author (GRA)

N82-30310# Lincoln Lab., Mass. Inst. of Tech., Lexington.

REMOTE SENSING OF TURBINE ENGINE GASES Final Report, 1 Oct. 1980 - 30 Sep. 1981

Dennis K. Killinger, Norman Menyuk, and Aram Mooradian 30 Sep. 1981 81 p refs

(Contract F19628-80-C-0002; AF Proj. 1900)

(AD-A115443; ESD-TR-82-014; AFESC/ESL-TR-82-016)

Avail: NTIS HC A05/MF A01 CSCL 20/5

This is the FY 81 final report on the program entitled 'Remote Sensing of Turbine Engine Gases'. The specific tasks which were conducted during FY 81 consisted of the following: (1) the feasibility demonstration of a dual-laser differential-absorption LIDAR(DIAL) system for the remote sensing of CO, NO, and C2H4, (2) the development of a data acquisition and processing system for the dual-laser DIAL system, (3) the laser remote sensing of CO and C2H4 in the exhaust of a stationary jet aircraft, and (4) the laser remote sensing of hydrazine, monomethylhydrazine (MMH), and unsymmetrical dimethylhydrazine (UDMH). GRA

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-30311# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

ROBUST CONTROL SYSTEMS M.S. Thesis

Eric D. Lloyd Dec. 1981 205 p refs

(AD-A115478; AFIT/GE/EE/81D-36) Avail: NTIS HC A10/MF A01 CSCL 01/3

The Doyle and Stein robustness enhancement technique for continuous-time LQG stochastic controllers was investigated in application to simple examples and a realistic Apollo Command Service Module/Lunar Module Thrust Vector Control System that exhibited severe robustness problems in its initial design. This technique was then extended to discrete-time systems in two ways. First, the continuous-time controller to which the Doyle and Stein technique had been applied was discretized using first order approximations. Second, an approximation to their continuous-time technique was developed for sampled-data control systems. In addition, an attempt was made to enhance the robustness of sampled-data systems by directly picking the gain of the Kalman filter within the controller structure based on an approach similar to that of Doyle and Stein. GRA

N82-30312# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.

THE LATERAL RESPONSE OF AN AIRSHIP TO TURBULENCE M.S. Thesis

John J. Wrobleski, Jr. Dec. 1981 151 p refs

(AD-A115197) Avail: NTIS HC A08/MF A01 CSCL 20/4

A method is derived for finding the linear response and loading transfer functions for the lateral aerodynamic case of airship flight through atmospheric turbulence. The functions obtained are in a form that can be applied to the various spectral analysis methods used to predict survivability currently employed by designers. A numerical example using the USS AKRON (ZR-4) is presented. The results show that peak motion response and loading occur when the encountered spectral component has a wavelength equal to the airship length, and that simple feedback of heading angle does not significantly decrease this peak. Author (GRA)

N82-30313# Hochschule der Bundeswehr, Munich. (West Germany). Fachbereich Luft-und Raumfahrttechnik.

OPTIMAL PERIODIC DOLPHIN GLIDING FLIGHT [OPTIMAL PERIODISCHER DELPHIN-SEGELFLUG]

E. D. Dickmanns Feb. 1982 48 p refs In GERMAN

Avail: NTIS HC A03/MF A01

Numerically calculated time optimal flight paths through vertical wind fields are discussed for different wind field types and airplane classes. For solution types 1 (prefers speed to altitude, globally optimal for small wind fields), the ratio of path oscillation wavelength to up-wind field wavelength was chosen as criterion for global optimization. The most favorable control sequence as well as the most favorable periodic boundary values for the speed components are determined. Calculations on examples for three wind field families and three airplane types with the best reciprocal glide numbers 29, 41, and 55, show that the unstationary type 2 ths for aerodynamically highly sophisticated airplanes with large wing load (water ballast) are more meaningful than for conventional gliders with small wing load. Author (ESA)

N82-30848# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

EFFECTS OF HIGHER ORDER CONTROL SYSTEMS ON AIRCRAFT APPROACH AND LANDING LONGITUDINAL HANDLING QUALITIES

Muhammad A. Pasha (Pakistan Air Force), John J. DAzo, and James T. Silverthorn *In* MIT Proc. of the 16th Conf. on Manual Control 1980 p 254-264 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 01C

N82-30849*# Princeton Univ., N. J. Flight Research Lab.

PILOT OPINIONS OF SAMPLING EFFECTS IN LATERAL DIRECTIONAL CONTROL

Robert F. Stengel and George E. Miller *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 265-270 refs (For primary document see N82-30833 21-51)

(Contract N00014-78-C-0257)

Avail: NTIS HC A99/MF A01 CSCL 01C

N82-30856*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

EVALUATION OF A TRAJECTORY COMMAND CONCEPT FOR MANUAL CONTROL OF CARRIER APPROACHES AND LANDINGS

Walter E. McNeill, G. Allan Smith, Jr., and Ronald M. Gerdes *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 370-392 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 01C

N82-30865*# Arnott (Douglas R.), Huntington Station, N.Y.

DOES MAN ALWAYS CLOSE THE LOOP IN TRYING TO PILOT A LARGE SHIP

Douglass R. Arnott and T. Govindaraj (Purdue Univ., Lafayette, Ind.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 533-539 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 01C

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-30314*# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.

CONTROL SOFTWARE FOR TWO DIMENSIONAL AIRFOIL TESTS USING A SELF-STREAMLINING FLEXIBLE WALLED TRANSONIC TEST SECTION Semiannual Progress Report for period ending Feb. 1982

S. W. D Wolf and M. J. Goodyer Jul. 1982 90 p refs

(Grant NsG-7172)

(NASA-CR-165941; NAS 1.26:165941) Avail: NTIS HC A05/MF A01 CSCL 14B

Operation of the Transonic Self-Streamlining Wind Tunnel (TSWT) involved on-line data acquisition with automatic wall adjustment. A tunnel run consisted of streamlining the walls from known starting contours in iterative steps and acquiring model data. Each run performs what is described as a streamlining cycle. The associated software is presented. Author

N82-30315# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

ANALYSIS AND PREPARATION OF A DIGITAL TERRAIN DATA BASE FOR FLIGHT SIMULATOR USE M.S. Thesis

Harry D. Ross Nov. 1981 68 p refs

(AD-A115547; AFIT/GEO/MA-81D-1) Avail: NTIS HC A04/MF A01 CSCL 08/6

The Air Force needs low-level, high speed flight simulators capable of producing correlated visual, radar, and infra-red display scenes. These scenes can be produced by computer generated imagery if a suitable data base is available. The purpose of this thesis is to develop a digital terrain data base suitable for use in a high speed, low-level flight simulator. A 164,000 square nautical mile data base was constructed from data supplied by the Defense Mapping Agency. This paper discussed the construction and organization of the data base, as well as the data retrieval algorithms. It was demonstrated that the data could be accessed fast enough to simulate Mach 1 flight.

Author (GRA)

N82-30838*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

PILOT/VEHICLE MODEL ANALYSIS OF VISUAL AND MOTION CUE REQUIREMENTS IN FLIGHT SIMULATION

R. Lancraft, G. Zacharias, and S. Baron *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 66-91 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01

N82-30851*# Massachusetts Inst. of Tech., Cambridge. Man Vehicle Lab.

COMBINED EFFECT OF THE OCULOGYRAL ILLUSION AND OF A FIXED PERIPHERAL FIELD ON SENSATIONS OF YAW MOTION

J. K. Huang and L. R. Young *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 286-291 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 14B

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-30316*# National Aeronautics and Space Administration, Washington, D. C.

FRENCH SPACE ACTIVITIES

R. Blanc May 1982 9 p Transl. into ENGLISH of "Las actividades espaciales francesas" (Ecuador), 1982 p 1-8 Presented at the United Nations Reg. Seminar on Space Appl., Quito, Ecuador, 19-23 Apr 1982 Transl. by SCITRAN, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76892; NAS 1.15:76892) Avail: NTIS HC A02/MF A01 CSCL 22A

The four main points of research and development of space programs by France are explained. The National Center of Space Studies is discussed, listing the missions of the Center and describing the activities of the staff. Author

N82-30317*# Little (Arthur D.), Inc., Cambridge, Mass.

ANALYTICAL FLOAT ZONE EXPERIMENTS SYSTEM (AFZES), PHASE B STUDY, VOLUME 1 Final Report

T. E. Hoffman 31 Jan. 1980 642 p refs

(Contract NAS8-32946)

(NASA-CR-162064; NAS 1.26:162064) Avail: NTIS HC A99/MF A01 CSCL 22A

The analytical float zone experiments system (AFZES) provides the system and reusable hardware capability to perform a variety of basic experiments in the floating zone configuration for materials processing aboard Spacelab flights. The problems associated with providing an AFZES that meets experimenter requirements are investigated and resolved. A viable baseline preliminary design for the AFZES is developed. A specific experiment relating to an investigation of Marangoni flow phenomena in a near zero gravity field to be performed on the AFZES is designed. A demonstration model of a laser Doppler velocimeter is developed and associated effort by selected principal investigators and others in the definition and development of the designated and other experiments suitable to be accommodated by AFZES are coordinated. S.L.

N82-30318# Committee on Science and Technology (U. S. House).

SPACE ACTIVITIES OF THE UNITED STATES, SOVIET UNION, AND OTHER LAUNCHING COUNTRIES/ ORGANIZATIONS, 1957 - 1981

Charles S. Sheldon, II and Marcia S. Smith Washington GPO 1982 139 p Rept. presented to the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 97th Congr., 2nd Sess., Jun. 1982 Prepared by Congressional Research Service, Library of Congress

(GPO-94-073) Avail: SOD HC CSCL 22A

The United States and Soviet Union are involved in launching satellites. Both programs are large and comprehensive, competing across a broad spectrum of military and civilian applications. While these two nations have the primary focus of space activities, several other governmental space programs are emerging. China, the European Space Agency (a group of eleven European countries), India, and Japan have existing capabilities to place satellites into orbit and are increasing the competition both for commercial traffic and for international prestige. In addition, these entities can also begin to launch military satellites (probably for reconnaissance purposes), breaking the hold that the United States and the Soviet Union have in obtaining information in this area. S.L.

N82-30319# Committee on Science and Technology (U. S. House).

FUTURE SPACE PROGRAMS, 1981

Washington GPO 1982 52 p ref Rept. presented by the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 97th Congr., 2nd Sess., May 1982

(GPO-88-000) Avail: Subcommittee on Space Science and Applications

Space programs were addressed in terms of their historical, economic and social context. The hearings were designed to examine how space programs relate to the Nation's wealth, broadly defined and what space programs can be fruitful investments. S.L.

N82-30320# European Space Agency, Paris (France). Space Science Dept.

THE ESA REPORT TO THE 24TH COSPAR MEETING

K. Bennett, P. Benvenuti, V. Domingo, R. Emery, V. Formisano, K. Knott, F. Macchetto, D. E. Page, M. A. C. Perryman, R. Reinhard et al May 1982 287 p refs Conf. held at Ottawa, May 1982 Original contains color illustrations

(ESA-SP-1040) Avail: NTIS HC A13/MF A01

The ESA satellites in orbit or decayed, and ESA projects under study or development are described. Four satellites are still operating: COS-B (gamma-ray astronomy); ISEE-2 (Sun/Earth relations and magnetosphere); IUE (ultraviolet astronomy); and GEOS-2 (magnetospheric fields, waves, and particles). Projects under development include the Spacelab payload, EXOSAT (location of bright X-ray sources) Hipparcos (astrometry) and Giotto (Halley's comet flyby). Author (ESA)

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N82-30321*# National Aeronautics and Space Administration, Washington, D. C.

THE GEOSTATIONARY ORBIT AND DEVELOPING COUNTRIES

E. Rodriguez Medina May 1982 10 p Transl. into ENGLISH of "La Orbita Geostacionaria y Los Paises en Desarrollo" Columbia, 1982 p 1-9 Presented at the UN Reg. Seminar on Space Appl., Columbia, 1982 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76891; NAS 1.15:76891) Avail: NTIS HC A02/MF A01 CSCL 12A

The geostationary orbit is becoming congested due to use by several countries throughout the world, and the request for use of this orbit is increasing. There are 188 geostationary stations

in operation. An equitable distribution of stations on this orbit is requested. S.L.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air)*.

N82-30322# Naval Research Lab., Washington, D. C.
EXPERIMENTAL OBSERVATIONS OF NAVAL SPACE SURVEILLANCE SATELLITE SIGNALS WITH AN OUT-OF-PLANE RECEIVING STATION Final Report
S. H. Knowles, R. H. Smith, and W. B. Waltman 15 Jun. 1982 45 p refs
(RR0340641)
(AD-A115330; NRL-MR-4831) Avail: NTIS HC A03/MF A01 CSCL 22/3

Experimental observations were made during May 1981 of satellites transiting the Naval Space Surveillance System's radio frequency fence. The receiving stations's location at Riverside, Maryland is well out of the plane of the NAVSPASUR fence; this made possible testing the efficiency of an out-of-plane station in enabling single-pass orbit determination. A signal-processing algorithm was developed that made possible the extraction of an additional item of information from each satellite transit by chirp processing. It was concluded that both an out-of-plane station and chirp processing have promise for enabling single-pass NAVSPASUR orbit determination. Author (GRA)

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-30323# Royal Aircraft Establishment, Farnborough (England). Space Dept.
THE APPLICATION OF ION PROPULSION TO THE TRANSPORTATION AND CONTROL OF SOLAR POWER SATELLITES
D. G. Fearn Apr. 1981 33 p refs
(RAE-TR-81043; BR80079; Space-595) Avail: NTIS HC A03/MF A01

The methods of transporting such masses as are characteristic of solar power satellites to geostationary orbit are reviewed. It is concluded that electric propulsion techniques offer very considerable technical and financial advantages, and that ion thrusters currently represent the most suitable technology to employ. It is also shown that the use of ion propulsion for attitude and orbit control would be of great benefit. An advanced form of ion thruster, which offers a very high beam velocity and current density, is proposed for these applications. M.G.

N82-30324*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
LAUNCH MISSION SUMMARY AND SEQUENCE OF EVENTS TELESAT-F(ANIK-D1)/DELTA-164
5 Aug. 1982 17 p refs
(NASA-TM-84833; KSC-GP-15-30; NAS 1.15:84833) Avail: NTIS HC A02/MF A01 CSCL 22B

The launch vehicle, spacecraft, and mission are summarized. Launch window information, vehicle telemetry coverage, real time data flow, telemetry coverage by station, selected trajectory information, and a brief sequence of flight events are included. S.L.

N82-30325# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A COMPARATIVE ANALYSIS OF KALMAN FILTERS USING A HYPERVELOCITY MISSILE SIMULATION M.S. Thesis
Donald W. Capps and Donald Chris Nelson Dec. 1981 220 p refs
(AD-A115545; AFIT/GE/EE/81D-13) Avail: NTIS HC A10/MF A01 CSCL 12/1

A systematic procedure is used to design Kalman Filters for a hypervelocity missile system. The procedure includes truth model development, state space model formulation, filter tuning and Monte Carlo analysis. The study is based upon a planar engagement of highly dynamic missile, a constant-velocity aircraft, and a stationary target. Two line-of-sight filters are developed using the rotating aircraft-to-target line-of-sight frame as a reference and two inertial filters are developed using an inertial frame reference. The angle between the aircraft-to-target line-of-sight and the aircraft-to-missile line-of-sight is the only physical measurement processed by the filters. Due to observability considerations, the inertial filters also process additional pseudo-measurements of range. The filters are compared by calculation of miss distance statistics, probability of kill, and computational loading. Author (GRA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

N82-30326# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
NASA/ROCKWELL INTERNATIONAL SPACE SHUTTLE ORBITER ABORT HEATING TEST (OH-111) Final Report, 25-30 Sep. 1981
L. A. Ticatch and K. W. Nutt Arnold AFS, Tenn. AEDC Nov. 1981 55 p refs
(AD-A115020; AEDC-TSR-81-V36) Avail: NTIS HC A04/MF A01 CSCL 22/2

Thin-skin thermocouple heat transfer tests were conducted on two 0.0175 scale and one 0.04 scale models of the Space Shuttle orbiter at attitudes that would be encountered in a transatlantic abort maneuver. The model angles of attack ranged from 40 to 55 degrees with yaw angle varying from -2 to 2 degrees. Data were obtained at Mach 8 in the AEDC-VKF Hypersonic Wind Tunnel B at free-stream Reynolds numbers ranging from 0.5 x 10 to the 6th power to 1.5 x 10 to the 6th power per foot. Author (GRA)

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

N82-30327# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
TECHNICAL ASSISTANCE TELEMETRY CHANNEL CODING INVESTIGATION Final Report
M. R. Best and H. F. A. Roefs Paris ESA 15 Apr. 1981 185 p refs
(Contracts ESTEC-4184/79/NL-NP; NIVR-1911)
(NLR-TR-81044-I; ESA-CR(P)-1559) Avail: NTIS HC A09/MF A01

The feasibility of an outer coding scheme for spacecraft to ground telemetry channels was investigated. A theoretical study and tradeoff of outer coding schemes, taking into account achievable performance, encoder/decoder complexity and compatibility with ESA operational requirements, were performed. The recommended scheme is a systematic (256, 224) Reed-

Solomon code over GF (257). The hardware implementation concept of the Reed-Solomon encoder is outlined and algorithms to be used in the Reed-Solomon decoder are given. The Fermat number transform for computing the syndrome values and error locations is elaborated. An algorithm that solves the equation which determines error locator and error evaluator polynomial is described. Author (ESA)

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-30328*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DEVELOPMENT OF RENE' 41 HONEYCOMB STRUCTURE AS AN INTEGRAL CRYOGENIC TANKAGE/FUSELAGE CONCEPT FOR FUTURE SPACE TRANSPORTATION SYSTEMS

John J. Shideler, Allan R. Swegle (Boeing Aerospace Co., Seattle), and Roger A. Fields (NASA. Dryden Flight Research Center) Jun. 1982 12 p refs Presented at the 23rd AIAA/ASME/ASCE/AHS Struct., Structural Dyn. and Mater. Conf., New Orleans, 10-12 May 1982

(NASA-TM-83306; NAS 1.15:83306; AIAA-Paper-82-0653) Avail: NTIS HC A02/MF A01

The status of the structural development of an integral cryogenic-tankage/hot-fuselage concept for future space transportation systems (STS) is discussed. The concept consists of a honeycomb sandwich structure which serves the combined functions of containment of cryogenic fuel, support of vehicle loads, and thermal protection from an entry heating environment. The inner face sheet is exposed to a cryogenic (LH2) temperature of -423 F during boost; and the outer face sheet, which is slotted to reduce thermal stress, is exposed to a maximum temperature of 1100 F during a high altitude, gliding entry. A fabrication process for a Rene' 41 honeycomb sandwich panel with a core density less than 1 percent was developed which is consistent with desirable heat treatment processes for high strength. B.W.

N82-30329*# Bendix Corp., Teterboro, N. J. Guidance Systems Div.

POWER MODULE CONTROL MOMENT GYRO Summary Report

30 Apr. 1979 57 p

(Contract NAS8-31236)

(NASA-CR-162055; NAS 1.26:162055) Avail: NTIS HC A04/MF A01 CSCL 22B

The directed design modifications to the Skylab/ATM CMG for application to the Power Module include new rotors of a different material with high resistance to stress corrosion cracking. The spin bearing retainer fix which was determined during the post Skylab mission was incorporated, and the speed pickoff was improved through the use of pickoff thermal cycling screening tests. The unlimited gimbal freedom on box axes was incorporated using slip ring assemblies. The on-orbit replacement capability was also incorporated for the CMG assembly and the inverter assembly. S.L.

N82-30330# Stuttgart Univ. (West Germany). Inst. fuer Raumfahrtantriebe.

REUSABLE AIR BREATHING BALLISTIC SPACE TRANSPORT SYSTEMS

Peter A. Kramer and Rolf D. Buehler Dec. 1981 10 p refs Presented at CNES Intern. Conf. on the Future of Launchers in Europe, Paris, 19-21 Jan. 1982 Sponsored by Deutsche Forschungsmeinschaft

(IRA-81-P-9) Avail: NTIS HC A02/MF A01

A space transporter concept is presented in which hydrogen fuelled ramjet propulsion theory is applied to a one and a half stage vertical takeoff and landing hydrogen/oxygen rocket core vehicle with ballistic ascent and descent. A payload to gross liftoff ratio of 10%, i.e., 2.5 times the value of pure rocket systems, is possible, with 56% propellant saving and 44% saving in dry weight. These results can be obtained with existing or near term structures and propulsion systems technology. Ramjet technology can be transferred from missile applications. A small size (155 Mg) reusable space transport system with 15.4 Mg payload in low Earth orbit is feasible. Author (ESA)

N82-30331# RESULT, Munich (West Germany).

DYNAMICS OF TWISTED BOOMS AND OF BOOMS WITH OFFSET

P. H. Kulla Paris ESA Mar. 1982 132 p refs

(Contract ESTEC-4376/80/NL-PP(SC))

(ESA-CR(P)-1571) Avail: NTIS HC A07/MF A01

The effects on spacecraft axial boom dynamic behavior of (a) translational and/or rotational offset of the boom root, and (b) a natural twist in the boom, are discussed. For condition (a) the nonlinear differential equations describing the equilibrium state are set up and solved. For certain parameter combinations not encountered with standard systems, multiple solutions do exist. The linear differential equations, describing small oscillations around the equilibrium states, are derived and solved for natural frequencies and related eigenfunctions. For standard axial booms, an offset error slightly increases the lowest natural frequency. For (b), coinciding in the undistrubed state with the spin axis, the eigenvalues and eigenfunctions are determined. For a boom with different bending stiffness in the two axes of the cross section, a pretwist slightly increases the lowest natural frequency, augmenting stability. Author (ESA)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-30332# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.

ROCKET RESEARCH AT GEORGIA TECH Final Report, 1 Oct. 1977 - 30 Sep. 1981

E. W. Price, W. C. Strahle, B. T. Zinn, J. E. Hubbartt, R. K. Sigman, and B. R. Daniel Nov. 1981 165 p refs

(Contract F49620-78-C-0003; AF Proj. 2308)

(AD-A114771; AFOSR-82-0368TR) Avail: NTIS HC A08/MF A01 CSCL 21/9

Progress is reported on four investigations of fundamentals of rockets and reaction propulsion: (1) Measurement of the dynamic response of solid propellant combustion to flow oscillations, using an impedance tube method. Measurements were made of pressure-coupled combustion response and bulk damping of aluminized and nonaluminized propellants, and the development of an apparatus for measurement of velocity coupled response is near completion; (2) Use of external base burning as a means of producing reduced drag or positive thrust on a supersonic bluff base flight vehicle. Flow field and surface measurements were made in cold flow simulation and in hydrogen

fueled tests in a Mach test duct; (3) Combustion of powdered aluminum as a fuel ingredient in solid propellants. A variety of tests were developed and used to clarify and control the agglomeration-combustion behavior of aluminum that usually compromises its effectiveness as a fuel; and (4) Turbulence-generated noise in the interior flow of rocket motors. Measurements were made in cold flow simulators of solid rocket combustors, and results were compared with predictions based on adaptation of the Bernoulli enthalpy theory of aeroacoustics. Author (GRA)

N82-30333# United Technologies Corp., Sunnyvale, Calif. Chemical Systems Div.

COUPLING BETWEEN VELOCITY OSCILLATIONS AND SOLID PROPELLANT COMBUSTION Annual Report, 1 Mar. 1981 - 28 Feb. 1982

R. S. Brown and R. C. Waugh Apr. 1982 23 p refs
(Contract F49620-81-C-0027; AF Proj. 2308)
(AD-A115413; AFOSR-82-0449TR) Avail: NTIS HC A02/MF A01 CSCL 21/8

A literature survey of velocity coupling found that existing analytical models do not predict instability reliably. Manifestations of velocity coupling in burners and motors are described in the literature as harmonic content and mean shift in pressure traces and susceptibility to triggering instability by pulsing. Evidence of these phenomena were found in numerous laboratory burners, research motors, and development motors. The motors which exhibited velocity coupling all had a large L/D ration. The severity of instability was found to depend on the propellant composition, grain geometry, nozzle geometry, and propellant conditioning temperature. A cold flow simulated rocket motor with porous walls has been constructed. Oscillatory heat flux at the wall has been measured in this simulated motor while driving pressure oscillations with a rotating valve. Author (GRA)

N82-30334# Dayton Univ., Ohio.

NONLINEAR COMBUSTION INSTABILITY IN SOLID ROCKET MOTORS: A NUMERICAL STUDY OF LONGITUDINAL OSCILLATIONS WITH PRESSURE AND VELOCITY COUPLING Final Interim Report, Feb. - Dec. 1981

Joseph D. Baum and Jay N. Levine (AFRPL, Edwards AFB, Calif.) Apr. 1982 45 p
(Contract F04611-81-C-0012; AF Proj. 2308)
(AD-A115084; UDR-TR-81-158; AFRPL-TR-82-006) Avail: NTIS HC A03/MF A01 CSCL 21/2

An existing nonlinear instability model has been extended and improved to allow it to more realistically treat the longitudinal shock wave type of combustion instability frequently encountered in tactical solid rocket motors. Results obtained utilizing this model to investigate limiting amplitude and velocity coupling phenomena in solid rocket motors are presented. An advanced finite difference integration technique capable of accurately describing shocks and contact discontinuities has been incorporated into the computer program, as well as an improved heat conduction solution, an heuristic velocity coupling model, and a spectral analysis capability. Solutions of wave propagation and shock formation and propagation in a variable area duct and a solid propellant rocket motor are presented; as are a number of solutions demonstrating that limiting amplitude is independent of the characteristics of the initial disturbance. Results of a preliminary study of nonlinear velocity modulated limit cycles are presented, as are results that demonstrate the primarily traveling wave nature of nonlinear wave propagation in solid rocket motors, and the complexity of the phase relationships between pressure, burning rate, and velocity oscillations are presented. Finally, the effect of a threshold velocity on non-linear velocity coupled instability was explored, and some of the results are also presented. Author (GRA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

No abstracts in this category.

24 COMPOSITE MATERIALS

Inciudes laminates.

N82-30335*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

MODULUS, STRENGTH AND THERMAL EXPOSURE STUDIES OF FP-Al2O3/ALUMINUM AND FP-Al2O3/MAGNESIUM COMPOSITES

R. T. Bhatt 1981 18 p refs Presented at the Symp. on Composites and Advanced Mater., Cocoa Beach, Fla., 18-24 Jan. 1981
(NASA-TM-82868; E-1238; NAS 1.15:82868; AVRADCOM-TR-81-C-1) Avail: NTIS HC A02/MF A01 CSCL 11D

The mechanical properties of FP-Al2O3 fiber reinforced composites prepared by liquid infiltration techniques are improved. A strengthening addition, magnesium, was incorporated with the aluminum-lithium matrix alloy usually selected for these composites because of its good wetting characteristics. This ternary composite, FP-Al2O3/Al-(2-3)Li-(3-5)Mg, showed improved transverse strength compared with FP-Al2O3/Al-(2-3)Li composites. The lower axial strengths found for the FP-Al2O3/Al-(2-3) Li-(3-5)Mg composites were attributed to fabrication related defects. Another technique was the use of Ti/B coated FP-Al2O3 fibers in the composites. This coating is readily wet by molten aluminum and permitted the use of more conventional aluminum alloys in the composites. However, the anticipated improvements in the axial and transverse strengths were not obtained due to poor bonding between the fiber coating and the matrix. A third approach studied to improve the strengths of FP-Al2O3 reinforced composites was the use of magnesium alloys as matrix materials. While these alloys wet fibers satisfactorily, the result indicated that the magnesium alloy composites used offered no axial strength or modulus advantage over FP-Al2O3/Al-(2-3)Li composites. S.L.

N82-30336*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

HIGH TEMPERATURE COMPOSITES. STATUS AND FUTURE DIRECTIONS

Robert A. Signorelli 1982 25 p refs Presented at the 4th Intern. Conf. on Composite Mater., Tokyo, 25-28 Oct. 1982
(NASA-TM-82929; E-1280; NAS 1.15:82929) Avail: NTIS HC A02/MF A01 CSCL 11D

A summary of research investigations of manufacturing methods, fabrication methods, and testing of high temperature composites for use in gas turbine engines is presented. Ceramic/ceramic, ceramic/metal, and metal/metal composites are considered. Directional solidification of superalloys and eutectic alloys, fiber reinforced metal and ceramic composites, ceramic fibers and whiskers, refractory coatings, metal fiber/metal composites, matrix metal selection, and the preparation of test specimens are discussed. J.D.

N82-30337*# National Aeronautics and Space Administration, Washington, D. C.

COMPOSITE MATERIALS: TOMORROW FOR THE DAY AFTER TOMORROW

Pierre Condom May 1982 21 p Transl. into ENGLISH from Aviation Mag. Intern. (France), no. 817, 1-14 Jan. 1982 p 34-39 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76709; NAS 1.15:76709) Avail: NTIS HC A02/MF A01 CSCL 11D

A description is given of the history of the use of composite

materials in the aerospace industry. Research programs underway to obtain exact data on the behavior of composite materials over time are discussed. It is concluded that metal composites have not yet replaced metals, but that that this may be a future possibility. Author

N82-30338*# Boeing Aerospace Co., Seattle, Wash. Engineering Technology.
DESIGN ALLOWABLES TEST PROGRAM, CELION 3000/-PMR-15 AND CELION 6000/PMR-15, GRAPHITE/-POLYIMIDE COMPOSITES Final Report
J. B. Cushman and Stephen F. McCleskey Hampton, Va. NASA. Langley Research Center Jun. 1982 206 p refs 5 Vol.
(Contract NAS1-15644)
(NASA-CR-165840; NAS 1.26:165840) Avail: NTIS HC A10/MF A01 CSCL 11D

A design allowables test program was conducted on Celion 3000/PRM-15 and Celion 6000/PMR-15 graphite/polyimide composite to estblish material performance over a 116 K (-250 F) to 589 K (600 F) temperature range. Effects of aging, thermal cycling and moisture were also evaluated. Tension, compression and in plane shear properties were determined for uniaxial, pseudoisotropic and +45 laminates. Test results show sufficient strength and stiffness to substantiate graphite/polyimide composites as an acceptable structural material for high temperature structural applications. Author

N82-30339# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Macromolecular Science.
RECENT PROGRESS IN THE STUDIES OF MOLECULAR AND MICROSTRUCTURE OF INTERFACES IN COMPOSITES, COATINGS AND ADHESIVE JOINTS
Hatsuo Ishida 6 May 1982 64 p refs
(Contract N00014-80-C-0533; NR Proj. 365-739)
(AD-A114621; TR-4) Avail: NTIS HC A04/MF A01 CSCL 11/4

Recent progress in the studies of molecular and microstructure of interfaces and interphases in composites, coatings and adhesives joints is reviewed. Remarkable progress has been made in elucidating the structure of silane coupling agents and their function with respect to dry and wet strengths of multiphase systems. Aminosilanes attracted major effort in the past. It is now understood that the structure of partially cured hydrolyzate is complicated. When adsorbed from a natural pH solution and dried in air at room temperature, approximately half of the amine group form amine bicarbonate salt with the CO2 in air. The rest of the amine groups are either intra-or intermolecularly hydrogen bonded to neighboring silanol groups or free from hydrogen bonding. There exists chemical bonding at the glass/silane or metal/silane interfaces. The surface characteristics, including acidity, topology and homogeneity, influence the structure of the coupling agent. The coupling agent interphase shows a gradient in various properties. Silanes tend to be ordered in the interphase and the degree of organization depends largely on the organofunctionality. The orientation and organization of the silane affect the reinforcement mechanism. There are chemisorbed and physisorbed silanes in the interphase. GRA

N82-30340# Atlantic Research Corp., Alexandria, Va.
NOTEBOOK ON ELECTROMAGNETIC PROPERTIES OF COMPOSITE MATERIALS BELOW 1 GHz Final Technical Report
D. R. Pflug, J. A. Birken, R. A. Wallenberg, and D. T. Auckland Sep. 1981 154 p refs
(Contract N00019-80-C-0157)
(AD-A115132; NAVAIR-AIR-518-9) Avail: NTIS HC A08/MF A01 CSCL 11/4

This report is the seventh in a series of reports on the electromagnetic properties of composites materials. The report quantitatively delineates: the vast differences in electromagnetic behavior exhibited by the principle composite materials (Graphite/-epoxy & Kelvar), how to predict these different properties based on the materials intrinsic electrical properties (conductivity, permeability and permittivity) and how the airframe shape influences electromagnetic coupling. The electromagnetic threats of lightning electromagnetic pulse (LEMP), nuclear Electromagnetic pulse (NEMP). Author (GRA)

N82-30341# Purdue Univ., Lafayette, Ind. Lab. for Thermophysical Properties Research.
THERMOPHYSICAL PROPERTY DETERMINATIONS USING TRANSIENT TECHNIQUES Annual Report, 15 Feb. 1981 - 15 Feb. 1982
R. E. Taylor, R. L. Shoemaker, and L. Koshigoe 31 Mar. 1982 12 p refs
(Contract F49620-81-K-0011; AF Proj. 2308)
(AD-A115356; TPRL-280; AFOSR-82-0446TR) Avail: NTIS HC A02/MF A01 CSCL 11/4

This program has as its objectives the measurement of the thermophysical properties of energetic materials (AP, HMX, and RDX) and of carbon/carbon materials. The specific heat of ammonium perchlorate up to the beginning of decomposition has been measured with a differential scanning calorimeter. The theory for the ramp heating of a sample with a heat pulse input for determining diffusivity and the heat conduction theory for strip heating have been investigated. Software has been written to accommodate ramp heating at rates up to 30 C per second using the pulse heating method for measuring diffusivity. Thermal diffusivity and specific heat measurements have been made on coarse weave carbon/carbon materials. The heat flow through both the individual fibers and the matrix material have been investigated using the flash diffusivity technique, for the purpose of verifying the applicability of the concept of diffusivity to this type of composite material. This work has indicated that an off-axis measurement procedure could be developed which uniquely defines the heat conduction in the various fiber directions for fiber composite material. Author (GRA)

N82-30342# Stanford Univ., Calif. Div. of Applied Mechanics.
AN EXAMPLE OF HOMOGENIZATION IN LINEAR THERMOELASTICITY Interim Report
Gilles A. Francfort May 1982 25 p refs
(Contract N00014-76-C-0054; NR Proj. 064-525)
(AD-A115116; SU-SUDAM-82-1) Avail: NTIS HC A02/MF A01 CSCL 20/13

This study is a sequel of Francfort 1, where homogenization of linear dynamic thermoelasticity with rapidly varying coefficients had been performed. We demonstrate how consideration of a simple one-dimensional example leads to numerical results that exhibit all the features that were theoretically predicted and in particular the presence of fast oscillations in the temperature field. Author (GRA)

N82-30343# Virginia Univ., Charlottesville. Dept. of Materials Science.
STRUCTURAL CHARACTERIZATION OF SCHLADITZ WHISKERS Final Technical Report, 1 Feb. 1976 - 28 Feb. 1982
H. G. F. Wilsdorf May 1982 49 p refs
(Contract N00014-75-C-0691)
(AD-A115098; UVA/525321/MS82/104) Avail: NTIS HC A03/MF A01 CSCL 11/4

Polycrystalline iron whiskers containing 1.5 w/o C and 0.8% O have an extraordinary ultimate tensile strength between 6 and 8 GPa. Their microstructure has been investigated by transmission electron microscopy and electron diffraction techniques. it has been found that the whiskers consist of alpha-Fe grains between 2 nm and 30 nm in diameter which do not have sharp boundaries but are separated by a wide boundary region. A microdispersion of alpha-Fe, Fe3O4, Fe3C, alpha-/Fe2O3 and carbon is prevalent throughout the whisker volume. Again, no sharp phase boundaries seem to exist which could imply a transitional region between second phase particles characterized by a concentration gradient and mixed covalent and metal bonding. It is concluded that a new strengthening mechanism for alloys is responsible for the mechanical properties of CVD produced steel whiskers. This mechanism requires a grain size below 30 nm, non-planar grain boundaries and a microdispersion of particles of iron oxides, iron carbides and carbon. Also, the covalent/metallic bonding mix within the transition region between the minute second phase particles and the alpha-Fe matrix is considered an essential component of the strengthening mechanism. GRA

N82-30344# Bosch (Robert) G.m.b.H., Stuttgart (West Germany).
CARBON FIBER REINFORCED COMPOSITE FOR ENDRO-

PROSTHETICS Final Report, Jul. 1980
Walter Gohl Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 75 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie Original contains color illustrations
(BMFT-FB-T-82-036; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16

A screening of materials shows that triazin resin carbon fiber composites (TCF) can be used for endoprosthetics. Mechanical tests demonstrate suitable elasticity, crack behavior, and strength characteristics for TCF. Biological and medical results are also satisfactory. Osteocompatibility is excellent and strength is higher than that of most materials which are presently used in endoprosthetics. As an unexpected result, duroplastic carbon fiber reinforced triazin resin proves more osteocompatible than polyethylene for the same applications. Author (ESA)

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics*.

N82-30345# Army Mobility Equipment Research and Development Center, Fort Belvoir, Va.
DEVELOPMENT OF AN ACCELERATED CORROSION TEST FOR SCREENING ANTIFREEZE COMPOUNDS Interim Report
James H. Conley and Robert G. Jamison Feb. 1982 21 p refs
(DA Proj. 1L7-22733-AH-20)
(AD-A114683; MERADCOM-2346) Avail: NTIS HC A02/MF A01 CSCL 11/7

The objective of this study was to develop an accelerated laboratory corrosion test for screening all antifreeze compounds, eliminating the need to conduct the costly and time-consuming simulated service test. The results of this phase of research indicate that this new accelerated bench corrosion test may replace the simulated service test. Author (GRA)

N82-30346# New York Univ., N. Y. Dept. of Chemistry.
ELECTRONIC PROCESSES IN POLAR LIQUIDS Final Report
Paul Delahay 10 May 1982 6 p refs
(Contract N00014-75-C-0397; NR Proj. 051-258)
(AD-A114958) Avail: NTIS HC A02/MF A01 CSCL 20/10

Work dealt with photoelectron emission by liquids and solutions under irradiation in the ultraviolet and vacuum ultraviolet ranges. The two complementary aspects of this work were: (1) energy distribution curves of emitted photoelectrons, and (2) quantum yield of emission as a function of photon energies. GRA

N82-30347# Naval Research Lab., Washington, D. C. Environmental Chemistry Branch.
AN IMPROVED LIGHT HYDROCARBON ANALYSIS SYSTEM Interim Report
R. A. Lamontagne 11 May 1982 10 p refs
(AD-A114575; NRL-8588) Avail: NTIS HC A02/MF A01 CSCL 07/4

A system for extracting and measuring ambient levels of C1-C4 hydrocarbons and carbon monoxide (CO) in seawater is described. The analytical instrument is a gas chromatograph with flame ionization detectors that incorporates a catalytic conversion of CO to CH4 (methane). The samples are concentrated prior to introduction to the chromatographic system. The volatile hydrocarbons are extracted from the seawater by the use of a helium flow stream and concentrated on dry ice-acetone cold traps. Air samples can be processed in a similar way. Author (GRA)

N82-30348# Wisconsin Univ., Madison. Mathematics Research Center.
COLLOCATION ANALYSIS OF MULTICOMPONENT DIFFUSION AND REACTIONS IN POROUS CATALYSTS
Jan P. Sorensen and Warren E. Stewart Feb. 1982 47 p refs
(Contract DAAG29-80-C-0041)
(AD-A114580; MRC-TSR-2341) Avail: NTIS HC A03/MF A01 CSCL 07/3

A collocation method is given for steady-state simulation of multiple reactions in porous catalysts. A realistic multicomponent diffusion model is used, which includes an allowance for pore size distribution. Hyperbolic basis functions are introduced to represent the intraparticle profiles; compact solutions are thus obtained both in the presence and absence of fast reactions. Calculations for a six-component catalytic reforming system show that the catalyst performance is strongly affected by intraparticle diffusion. Author (GRA)

N82-30349# Wisconsin Univ., Madison. Mathematics Research Center.
A MICROSCOPIC MODEL FOR CATALYST SURFACES. 2: SUPPORTED CATALYSTS
Klavs F. Jensen and W. Harmon Ray Feb. 1982 76 p refs Sponsored in part by NSF and Petroleum Research Fund
(Contract DAAG29-80-C-0041)
(AD-A114572; MRC-TSR-2338) Avail: NTIS HC A05/MF A01 CSCL 12/1

A new 'pebbly surface' model of supported metal catalysts is presented which can explain observed multiplicity and oscillatory behaviour of catalyst particles. This model combines the dynamic behaviour of the individual metal crystallites on the surface of the support with diffusion and heat transfer processes in the porous particle. The bifurcation of oscillations is analyzed in terms of relaxation oscillations as well as by Hopf's theorem and it is shown how the bifurcation phenomena depend on the system parameters. The parameter study may be used to suggest operating conditions and catalyst design parameters such that sintering effects may be reduced. Qualitative comparisons with data for carbon monoxide oxidation at various temperatures show very good agreement; however, this present simple form of the pebbly surface model seems unable to predict the long period oscillations observed in hydrogen oxidation. Author (GRA)

N82-30350# Wisconsin Univ., Madison. Mathematics Research Center.
ACTIVATION ENERGY ASYMPTOTICS APPLIED TO BURNING CARBON PARTICLES Technical Summary Report
David R. Kassoy Jan. 1982 38 p refs
(Contracts DAAG29-80-C-0041; DAAG29-79-C-0084)
(AD-A114477; MRC-TSR-2322) Avail: NTIS HC A03/MF A01 CSCL 21/2

The method of activation energy asymptotics is used to describe the entire history of a carbon particle suddenly immersed in a hot oxidizing ambient. Under appropriate conditions which are established by the analysis, the history of the particle is shown to consist principally of a heat-up period during which no significant chemical reaction takes place followed by a period involving diffusion-limited mass loss and terminating in complete particle consumption. Between these two extended periods brief ignition and post-ignition periods are described. The final demise of the particle occurs in a complex extinction period during which all the quantities describing the particle behavior undergo large variations. Author (GRA)

N82-30351# Texas A&M Univ., College Station. Dept. of Chemistry.
RECENT ADVANCES IN MULTICOMPONENT FLUORESCENCE ANALYSIS Interim Technical Report
Isiah M. Warner and Linda B. McGown (California State Univ., Long Beach) 20 Apr. 1982 70 p refs Submitted for publication
(Contracts N00014-80-C-0703; DE-AS05-80EV-10404; NR Proj. 051-747)
(AD-A115233; TR-6) Avail: NTIS HC A04/MF A01 CSCL 20/6

Numerous advances in fluorescence spectroscopy have been

made in the past few years. Many of these advances have come in the form of improved instrumentation and new data reduction strategies. Primary emphasis of these new strategies is to develop new systems for multicomponent analysis. This manuscript described a number of recent advances in fluorescence spectroscopy with primary emphasis on multicomponent techniques. Methods for increasing sensitivity of fluorescence analysis are also discussed, along with a few new ideas for use in conventional instrumentation. Author (GRA)

N82-30352# Dayton Univ., Ohio.
STATISTICAL ANALYSIS OF SOLID PROPELLANT COMBUSTION Final Report
R. L. Glick Oct. 1981 17 p refs
(Grant AF-AFOSR-0022-79; AF Proj. 2308)
(AD-A115234; UDR-TM-81-128; AFOSR-82-0450TR) Avail: NTIS HC A02/MF A01 CSCL 21/9

Studies were directed at direct measurement of the acoustic admittance of burning solid propellant with concurrent pressure and optical anemometry measurements, internal ballistics of spin stabilized nozzleless rocket motors, and the application of Hilbert transforms to the computation of the imagnary part of the pressure coupled response from data for the real part. An optical anemometer based on an Argon ion laser and tracker electronics and a servo-positioned window strand burner based on Princeton window burner were constructed. The servo-positioned strand burner operated successfully and Doppler burst phenomena were observed. However, tracker lock-on was not achieved. The spin stabilized nozzleless analysis showed that gas dynamic spin effects (as contrasted with acceleration induced burning rate changes) were small for tangential Mach numbers below 0.1. The Hilbert transform study showed that the imaginary part of the response function could be computed from the real part with acceptable accuracy for frequencies below one-third of the maximum frequency of the data. Author (GRA)

N82-30353# Cornell Univ., Ithaca, N. Y. Dept. of Chemistry.
TWO DIMENSIONAL MASS SPECTROMETRIC SEPARATION AND IDENTIFICATION OF COMPLEX MIXTURES Final Report, 1 Mar. 1979 - 28 Feb. 1982
F. W. McLafferty 10 May 1982 6 p
(Contract DAAG29-79-C-0046)
(AD-A115202; ARO-16192.12-CH) Avail: NTIS HC A02/MF A01 CSCL 20/6

The new technique of tandem mass spectrometry (MS/MS) has been investigated, in particular for the analysis of complex organic mixtures for trace components. Applicability, limitations, and improvements studied include those involving sensitivity, specificity, accuracy, speed, and identification of unknown components. The technique has been applied to important problems in targeted compound analysis, targeted class analysis, molecular structure determination, and unimolecular ion decomposition mechanisms. A unique tandem double-focusing mass spectrometer has been constructed, improved, and applied to these research problems. Author (GRA)

N82-30354# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Macromolecular Science.
STRUCTURE AND ADSORPTION CHARACTERISTICS OF SILANE COUPLING AGENTS ON SILICA AND E-GLASS FIBER: DEPENDENCE ON pH
S. Naviroj, S. Cullen, J. L. Koenig, and H. Ishida 2 Jun. 1982 35 p refs
(Contract N00014-80-C-0533; NR Proj. 356-739)
(AD-A115293; TR-5) Avail: NTIS HC A03/MF A01 CSCL 07/4

Fourier transform infrared spectroscopy was used to study the adsorption of silane coupling agents on silica and E-glass fiber surfaces. The structures of the adsorbed species of gamma-aminopropyltriethoxysilane (gamma-APS) coupling agent under various preparation conditions are postulated on an interpretation of the NH deformation and SiOH stretching modes. The amount of gamma-APS deposited on high-surface-area silica depends on the pH of the treating solution. On the contrary, the amounts of adsorption of gamma-methacryloxypropyltrimethoxysilane (gamma-MPS) and vinyltriethoxysilane (VS) coupling agents are independent of ph. GRA

N82-30355# Naval Oceanographic Office, Bay St. Louis, Miss.
USE OF GALLIUM TRIPLE POINT AS HIGH TEMPERATURE REFERENCE Final Report
A. Edward Gent and Andrew Guess Jan. 1982 9 p
(AD-A115237; NOO-TR-281) Avail: NTIS HC A02/MF A01 CSCL 07/4

Evaluation of a triple point of gallium cell for use as a primary standard in checking the accuracy of laboratory platinum resistance thermometers is described. This device allows PRT's to be checked at the upper range of interest in oceanographic temperatures. The temperature specification for the gallium triple point cell is 29.7739 + or - .0001 C. Author (GRA)

N82-30356# Northeastern Univ., Boston, Mass. Electronics Research Lab.
CONTROL ELECTRONICS FOR AIR-BORNE QUADRUPOLE ION MASS SPECTROMETER Final Report, 15 Sep. 1978 - 14 Sep. 1981
J. Spencer Rochefort and Raimundas Sukys Oct. 1981 310 p refs
(Contract F19628-78-C-0218; AF Proj. 2310)
(AD-A115399; AFGL-TR-82-0056) Avail: NTIS HC A14/MF A01 CSCL 07/4

The work concerned in this report spans the three-year period commencing 15 September 1978 and deals with the development of electronic instrumentation for rocket and balloon-borne quadrupole ion mass spectrometers. Electronic packages containing circuits to control the quadrupole filters and data processing were developed for sounding rockets launched from Red Lake, Ontario, Canada during the 26 February 1979 Solar Eclipse; from the Poker Flat Research Range, Chatanika, Alaska during 1980 and 1981 Solar Proton Event Programs and also the 1981 Auroral E Program. A microprocessor-based control system was developed for a balloon-borne mass spectrometer. This latter system also provides a two-way communications link for ground control of the experiment and data transmission during the flight. Author (GRA)

N82-30357# Mound Lab., Miamisburg, Ohio.
INHIBITING THE CO/CO2 REACTION BETWEEN CARBON AND PLUTONIA AT ELEVATED TEMPERATURES
E. W. Johnson 1981 7 p refs Presented at the 9th DOE Compatibility Meeting, St. Petersburg, Fla., 27 Oct. 1981
(Contract DE-AC04-76DP-00053)
(DE82-002593; MLM-2872-OP; CONF-811076-4) Avail: NTIS HC A02/MF A01

One of the problems associated with the sometimes protracted, ground storaged of space PuO radioisotopic thermoelctric generatos (RTG) devices is the ingrowth of carbon dioxide and carbon monoxide in the gas phase due to the cyclical reaction established between the fuel (238 PuO2) and the carbon impact body. This ingrowth proceeds according to the two equations: xCO + PuO2 = xCO2 + PuO2-x (1) and xCO2 + xC = 2xCO, etc. (2) This reaction stops after launch because the two solid-phase reactants are physically separated when the inside of the RTG is evacuated to space for performance reasons. When the RTG is stored on the ground, however, the product gases become established and can cause degradation of the solid-state thermoelectric elements. Controlling the reduction of the plutonia to such an extent that reaction (1) becomes thermodynamically unfavorable minimizes the continued generation of CO and CO2. The conditions necessary to maintain plutonia at a substoichiometric level are being determined. These test conditions are described and are supported with data from previous heat source studies. A facility to perform the necessary treatment is described. DOE

N82-30358# Ontario Research Foundation, Toronto.
SOLVENT RECOVERY FOR THE OIL-AGGLOMERATION COAL-CLEANING PROCESS Final Report
C. H. Cheh Sep. 1981 80 p refs Sponsored by EPRI
(EPRI Proj. 1840-1)
(DE82-900855; EPRI-CS-2057) Avail: NTIS HC A05/MF A01

Solvent removal and recovery from coal pellets produced by the spherical agglomeration process were studied. Different types of pellets were prepared using an eastern and a western coal and three grades of solvents. Three dryers, namely Turbo, Roto-louvre, and Holo-flite, were selected for laboratory testing

to remove the solvent from the pellets. Results showed that all three dryers can evaporate the solvent from the coal pellets to very low levels; however, a large amount of coal fines was generated in the Holo-flite dryer. Superheated steam and simulated flue gas were tested as the driving media to study the drying and recovery of the solvent from the coal pellets. Solvent recovery was found to be very high when superheated steam was used but very poor when simulated flue gas was used. It is recommended that the Turbo dryer, which has been using superheated steam in some of its commercial units, be studied further on a pilot scale. A flow scheme of the pilot plant is proposed. DOE

N82-30359# Pittsburg and Midway Coal Mining Co., Englewood, Colo.
SOLVENT REFINED COAL (SRC) PROCESS: FLUID DYNAMIC BEHAVIOR OF LARGE BUBBLE COLUMNS Interim Report
K. Parimi Jan. 1982 28 p refs
(Contract DE-AC05-76ET-10104)
(DE82-007660; DOE/ET-10104/39; Rept-560RM162; Rept-53; IR-56) Avail: NTIS HC A03/MF A01

The fluid dynamics of large scale bubble columns were studied. An experimental program to test specific design concepts were devised and design improvements for the SRC-II demonstration plant dissolver were recommended. Existing knowledge in the areas of flow regime, gas holdup and mass transfer, backmixing and solids accumulation is reviewed. DOE

N82-30360# Pittsburg and Midway Coal Mining Co., Englewood, Colo.
SOLVENT REFINED COAL (SRC) PROCESS: COKING OF SRC-2 PROCESS STREAMS. PART 1: COKING CHARACTERIZATION AND COKING METHOD DEVELOPMENT FOR SRC-2 PROCESS STREAMS. PART 2: MICROPROCESS COKING STUDIES AND DATA VERIFICATION AND CORRELATIONS Topical Report, Jan. 1980 - Sep. 1981
C. S. Wen Sep. 1981 141 p refs
(Contract DE-AC05-79ET-10104)
(DE82-005308; DOE/ET-10104/21; Rept-627RM083; Rept-53; IR-44) Avail: NTIS HC A07/MF A01

Characterization of SRC-II process streams and solids with respect to coke formation was studied using methods developed specifically for this purpose, such as solvent fractionation, thermogravimetry, Fourier transform infrared spectroscopy, and scanning electron/optical microscopy. Different process streams were investigated including coal feedstock, feed slurry, dissolver effluent, atmospheric flash bottoms, vacuum tower bottoms, process solvent, recycle slurry, and coke-like materials from dissolver and hot separator as well as a Ft. Lewis dissolver preheater outlet sample. In the solvent fractionation study, solids from the dissolver contained very small amounts of toluene and pyridine solubles. Heavy solid products such as atmospheric flash bottoms and vacuum tower bottoms usually have about 45% wt pyridine insolubles. The amount of fixed carbon plus heavy volatile matter in certain streams appears to give a good correlation with coke formation in continuous pilot plant operations. DOE

N82-30361# Pittsburg and Midway Coal Mining Co., Englewood, Colo.
SOLVENT REFINED COAL (SRC) PROCESS: SRC 2 PROCESSING OF PITTSBURG SEAM (IRELAND AND POWHATAN NO. 6 MINES) COAL IN PDU P-99. RUNS P99-77 TO P99-83 Interim Report, Nov. 1980 - Apr. 1981
H. G. McIlvried, W. Gall, and S. T. Mathias Aug. 1981 240 p refs
(Contract DE-AC05-79ET-10104)
(DE82-004481; DOE/ET-10104/20; Rept-53; IR-43) Avail: NTIS HC A11/MF A01

The results of seven solvent refined coal-II runs (Runs P99-77 through P99-83) made on Process Development Unit P-99 feeding two Pittsburg Seam coals are presented. The first five runs were made on Ireland Mine coal, while the latter two runs used Powhatan No. 6 Mine coal. Four of these runs (Runs P99-77, -78, -80, and -81) form a 2(2) factorial experiment to investigate the effect of dissolver lift-drag ratio (L/D) ratio and the concentration of 550oF- distillate in the feed slurry on yields. The results of this factorial experiment generally confirm conclusions reported previously: dissolver L/D ratio has little effect on yields over the range of L/D ratio studied; and increasing the amount of light distillate in the feed slurry significantly increases the yield of heavy distillate. DOE

N82-30362# Pittsburg and Midway Coal Mining Co., Englewood, Colo. Technology and Materials Dept.
SOLVENT-REFINED-COAL (SRC) PROCESS. SOLIDS WITHDRAWAL FROM THREE PHASE FLUIDIZED BED REACTORS Interim Report
K. Parimi and M. D. Pitchford Jan. 1982 74 p refs
(Contract DE-AC02-79ET-10104)
(DE82-010203; DOE/ET-10104/26; Rept-560RM159; Rept-53; IR-49) Avail: NTIS HC A04/MF A01

Gas holdup, solids accumulation, and backmixing were studied in a tall, cold flow bubble column in support of the design of the dissolver for the solvent refined coal demonstration plant. Both two and three phase systems were examined to determine the effect of liquid/slurry and gas superficial velocities, solids concentration, solids particle size, liquid surface tension, and the presence of a solids withdrawal system on gas holdup. It was found that gas holdup was nearly independent of variations in liquid/slurry superficial velocity and the presence of a solids withdrawal system, that gas holdup varied significantly with changes in liquid surface tension, and that the variation of gas holdup with gas superficial velocity follows that predicted by existing correlations in the literature. Solids accumulation of large particles was simulated and examined as a function of gas and slurry superficial velocity. It was found that both gas and slurry velocity had an influence on the tendency of solids to accumulate, the latter having the strongest effect. Qualitative tests are performed to characterize the degree of backmixing using a methyl orange dye tracer. it was concluded that backmixing in the column may not be as high as predicted by existing correlations. Additional tests to quantify the level of backmixing are necessary to establish correlations for use in scale up. DOE

N82-30363# Pittsburg and Midway Coal Mining Co., Englewood, Colo. Chemical and Minerals Div.
SOLVENT-REFINED-COAL(SRC)PROCESS, HYDRODYNAMICS AND AXIAL MIXING IN A THREE PHASE BUBBLE COLUMN Interm Report
S. Kara (Pittsburgh Univ.), B. G. Kelkar (Pittsburgh Univ.), Y. T. Shah (Pittsburgh Univ.), and N. L. Carr (Gulf Research and Development Co., Pittsburgh) Jan. 1982 54 p refs
(Contract DE-AC05-79ET-10104)
(DE82-007255; DOE/ET-10104/28; Rept-53; IR-51) Avail: NTIS HC A04/MF A01

The hydrodynamics and the mixing properties in a 15.2 cm diameter by 335.3 cm high stainless steel column with three phases (air, water and coal) in cocurrent upflow were studied. The effect of solids particles size, solids concentration, slurry velocity and gas velocity on gas holdup and heat dispersion coefficients were determined. All the experimental data were correlated empirically and the results were compared with other published literature. Theoretical explanations of some results were provided. DOE

N82-30364# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Radiology.
IONIZATION IN LIQUIDS Progress Report, 1 May 1981 - 30 Apr. 1982
G. Bakale 31 Dec. 1981 48 p refs
(Contract DE-AC02-78EV-04746)
(DE82-006918; DOE/EV-04746/1) Avail: NTIS HC A03/MF A01

Significant progress has been made in better understanding the electron transport and reaction properties of model liquids and biological systems. The new results complement earlier studies of electrons and are important to all aspects of the interaction of radiation with matter and to the myriad of electronic processes that occur in a variety of systems. These processes range from dielectric breakdown to carcinogenesis as is illustrated in the following list of electron transport and reaction studies that were conducted in this contract period. The studies included: (1)effect of an external electric field on the electron attachment rate constant, k/sub e/, of SF6 observed in the molecular liquids ethane and propane; (2) implications of field-dependent k/sub

e/'s to dielectric breakdown in liquids; (3) influence of the electron-ac ceptor dipole moment on k/sub e/ in i-octane and the effect of solvent on electron-dipole interaction; (4) solvent effects on the electron-attachment process through measurements of the k/sub e/ of CCl4 and ethyl bromide in i-octane/TMS mixtures; (5) electron attachment to reversed-micellar aggregates and comparison of the influence of the micellar water pool on the electron-capture process in the solvents i-octane and TMS; (6) correlation of diffusion-controlled k/sub e/'s with carcinogenicity and the effect of solvents on the k/sub e/-carcinogenicity correlation; (7) determination of the bacterial mutagengenicity of series of nitroaromatic compounds which have diffusion-controlled k/sub e/'s; and (8) determination of radiation-induced mutagenesis in the Ames' Salmonella tester strains. GRA

N82-30365# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

SOLID-GAS EQUILIBRIA IN CaSO3-H2Og SYSTEM AND LEWIS-ACID-BASE ALLOYS Ph.D. Thesis

Bea-Jane Lin Oct. 1981 140 p refs

(Contract W-7405-eng-48)

(DE82-003327; LBL-13466) Avail: NTIS HC A07/MF A01

The calcium sulfite in flue gas desulfurization of lime/limestone scrubbers makes it desirable to work out its thermodynamic properties. A thermogravimetric apparatus was used to study the equilibria between calcium sulfite hemihydrate and calcium sulfite anhydrite under different conditions. The kinetics and thermodynamics for the dissociation of calcium sulfite hemihydrate were examined. The confirmation of Engel-Brewer's correlation between the electronic configuration and crystal structure in metallic systems was pursued in this group by studying the Lewis-acid-base interactions. Tantalum iridium alloys of different compositions were brought into equilibrium with various steam/hydrogen mixtures in the same thermogravimetric setup. DOE

N82-30366# Combustion Engineering, Inc., Chattanooga, Tenn.

RADIOGRAPHIC SYSTEM FOR EVALUATION OF STEAM-GENERATOR SUPPORT-PLATE INTEGRITY Final Report

W. R. McDearman, F. T. Radcliff, and T. D. Jamison Sep. 1981 75 p Sponsored by Electric Power Research Inst.

(EPRI Proj. S105-1)

(DE82-900372; EPRI-NP-2042) Avail: NTIS HC A04/MF A01

Radiographic techniques and equipment have been developed to identify significant damage in the support plate ligaments between tube holes and flow holes. The radiographic technique utilizes a dual source, with the source positioned equidistant above and below the plate inside a tube to provide a distribution of penetrating radiation to produce a relatively uniform density radiograph of the ligaments. Surrounding the source tube, as many as six film cassettes mounted on carriers are placed at the appropriate elevation within adjacent steam generator tubes and exposed simulaneously. The sources and multiple cassette carriers are manipulated by independent systems which utilize eddy current methods to properly locate these components with respect to the support plates. This radiographic system has been demonstrated in a realistic full-scale mock-up. Simulated cracks were clearly detectable when they extended halfway through the plate thickness. DOE

N82-30367# Sandia Labs., Albuquerque, N. Mex. Exploratory Batteries Div.

PASSIVATION OF LITHIUM IN ACETONITRILE SOLUTIONS OF SO2

Calvin D. Jaeger and Frank M. Delnick 1981 9 p refs Presented at the Electrochem. Soc. Conf., Denver, 11 Oct. 1981

(Contract DE-AC04-76DP-00789)

(DE82-003053; SAND-81-1144C; CONF-811013-9) Avail: NTIS HC A02/MF A01

The complex impedance of passive lithium electrodes in acetonitrile solutions of SO2 was measured over the frequency range of 8 kHz to 0.5 Hz. The response of lithium anodes to a galvanostatic pulse was evaluated at different current densities. The response of the lithium electrode to these galvanostatic pulses was related to features of the complex impedance spectrum. The addition of water to the system affected both the complex impedance and pulse behavior of the lithium electrode. A voltage delay was observed only after water was added to the cell. Other factors such as temperature and passage of current also affect the complex impedance spectrum of the lithium electrode. DOE

N82-30368# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Theoretische Stroemungsmechanick.

A MODEL ANALYSIS OF SEPARATION INITIATED EXTERNAL COMBUSTION IN SUPERSONIC FLOW OVER A FLAT PLATE

Yi Chuin Sun Nov. 1981 56 p refs

(DFVLR-FB-82-04) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 16

A simple model based on experimental results is analyzed for the flow configuration caused by lateral injection of secondary medium into a primary supersonic flow and further by initiating external combustion in front of a jet spoiler. Despite the uncertainty of the burnt fraction of fuel, analytical results are obtained which indicate the flow conditions. From the simple model analysis, it becomes evident that relatively high coefficients of lateral force are attainable for a jet spoiler coupled with external combustion. Author (ESA)

N82-30369# Bergbau-Forschung G.m.b.H., Essen (West Germany). Abteilung Verfahrenstechnik.

CAKING AND COKING POWER OF BITUMINOUS COALS UNDER HIGH PRESSURE Final Report, Apr. 1981

Hans-Dieter Beyer Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 62 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-055; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13

The caking and coking power of bituminous coals, characterized by the swelling index (DIN 51 741, ISO 501) and the dilatometer test (DIN 51 739), respectively, were studied at high pressures. In the context of the further development of coal gasification processes, pressures up to 100 bar were considered. Pressure devices were developed in which swelling index and dilatation can be measured at pressures up to 100 bar under the geometric and thermal conditions required for standard methods. Pressure, heating rate, coal grain size and gas atmosphere (Ar and H2) were varied apart from the coal type in the course of the measurements. The measurements show swelling index and dilatation may decrease, may sometimes increase or increase first followed by a decrease at higher pressures. Therefore, it is in general not possible to establish relationships according to which the data characterizing caking and coking power can be calculated on the basis of the data obtained under standard conditions. For this reason, the prediction of caking and coking power of feed coals in coal refining processes, working under pressure, requires measurements conducted under the envisaged operating pressure. The developed pressure devices are suited for this purpose and can be used on a routine basis. Author (ESA)

N82-30370# National Bureau of Standards, Washington, D.C.

TECHNICAL ACTIVITIES 1981 OFFICE OF STANDARD REFERENCE DATA

S. P. Fivozinsky, ed. Dec. 1981 82 p refs

(PB82-165820; NBSIR-81-2442) Avail: NTIS HC A05/MF A01 CSCL 07D

The Office of Standard Reference Data is one of six program offices in the National Measurement Laboratory, National Bureau of Standards. The Standard Reference Data Program develops and disseminates data baes of critically evaluated physical/chemical properties of substances. Th3se data bases are available through NBS and private publications, on magnetic tape and from on-line retrieval systems. The Office of Standard Reference Data is responsible for management and coordination of the program. Work is carried out through a decentralized network of data centers and projects referred to as the National Standard Reference Data System (NSRDS). This volume summarizes the activities of the program for the year 1981. Author

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-30371* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
REFRACTORY COATINGS Patent
William A. Brainard and Donald R. Wheeler, inventors (to NASA) Issued 27 Jul. 1982 4 p Filed 29 Sep. 1980 Division of US Patent Appl. SN-102003, filed 7 Dec. 1979
(NASA-Case-LEW-13169-2; US-Patent-4,341,843; US-Patent-Appl-SN-191746; US-Patent-Appl-SN-102003; US-Patent-Class-428-457; US-Patent-Class-204-192C; US-Patent-Class-428-472) Avail: US Patent and Trademark Office CSCL 11F

A thin sputtered film is discussed which exhibits improved adherence to a substrate and has improved friction and wear characteristics. Each substrate is placed directly below a titanium carbide target of a commercial radiofrequency diode apparatus in a vacuum chamber. Nitrogen is bled into the system through a nozzle resulting in a small partial pressure of about 0.5% to 2.5% during the first two minutes of deposition. The flow of nitrogen is then stopped, and the sputtering ambient is reduced to pure argon through a nozzle without interrupting the sputtering process.

Official Gazette of the U.S. Patent and Trademark Office

N82-30372*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EVALUATION OF CANDIDATE STIRLING ENGINE HEATER TUBE ALLOYS AT 820 DEG AND 860 DEG C Final Report
John A. Misencik Jun. 1982 43 p refs
(Contract DE-AI01-77CS-51040)
(NASA-TM-82837; E-1204; DOE/NASA/51040-39; NAS 1.15:82837) Avail: NTIS HC A03/MF A01 CSCL 11F

Seven commercial alloys were evaluated in Stirling simulator materials rigs. Five iron-base alloys (N-155, A-286, Incoloy 800, 19-9DL, and 316 stainless steel), one nickel base alloy (Inconel 718), and one cobalt base alloy (HS-188) were tested in the form of thin wall tubing in a diesel fuel fired test rig. Tubes filled with hydrogen or helium at gas pressure of 21.6 MPa and temperatures of 820 and 860 C were endurance tested for 1000 and 535 hours, respectively. Results showed that under these conditions hydrogen permeated rapidly through the tube walls, thus requiring refilling during each five hour cycle. Helium was readily contained, exhibiting no measurable loss by permeation. Helium filled tubes tested at 860 C all exhibited creep-rupture failures within the 535 hour endurance test. Subsequent tensile test evaluation after removal from the rig indicated reduced room temperature ductility for some hydrogen-filled tubes compared to helium-filled tubes, suggesting possible hydrogen embrittlement in these alloys. S.L.

N82-30373*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF FUEL TO AIR RATIO ON MACH 0.3 BURNER RIG HOT CORROSION OF ZrO2-Y2O3 THERMAL BARRIER COATINGS
Philip E. Hodge Jul. 1982 11 p refs
(Contract DE-AI01-77ET-10350)
(NASA-TM-82879; E-1255; DOE/NASA/10350-32; NAS 1.15:82879) Avail: NTIS HC A02/MF A01 CSCL 11F

A Mach 0.3 burner rig test program was conducted to determine how the fuel to air mass ratio affects the durability of ZrO2-Y2O3/Ni-16Cr-6Al-0.31Y thermal barrier coating systems in combustion products containing 5 ppm Na and 2 ppm V. As the fuel to air mass ratio was increased from 0.039 to 0.049, the durability of ZrO2-6Y2O3, ZrO2-8Y2O3 and ZrO2-12Y2O3 coatins decreased. ZrO2-8Y2O3 coatings were approximately 2X and 1.3X more durable than ZrO2-12Y2O3 and ZrO2-6Y2O3 coatings respectively at the fuel to air mass ratio of 0.039. The number of one hour cycles endured by ZrO2-8Y2O3 coatings varied from averages of 53 to 200 for the fuel to air mass ratios of 0.049 and 0.039, respectively. At the fuel to air mass ratio of 0.049, all ZrO2-Y2O3 coated specimens failed in 40 to 60 one hour cycles S.L.

N82-30374*# Purdue Univ., Lafayette, Ind.
MC CARBIDE STRUCTURES IN M(LC2)AR-M247 M.S. Thesis - Final Report
Stanley Walter Wawro Jun. 1982 53 p refs
(Contract NAG3-59)
(NASA-CR-167892; NAS 1.26:167892) Avail: NTIS HC A04/MF A01 CSCL 11F

The morphologies and distribution of the MC carbides in Mar-M247 ingot stock and castings were investigated using metallographic, X-ray diffraction and energy-dispersive X-ray analysis techniques. The MC carbides were found to form script structures during solidification. The script structures were composed of three distinct parts. The central cores and elongated arms of the MC carbide script structures had compositions (Ti, Cr, Hf, Ta, W)C and lattice parameters of 4.39 A. The elongated script arms terminated in enlarged, angular 'heads'. The heads had compositions (Ti, Hf, Ta, W)C and lattice parameters of approximately 4.50 A. The heads had a higher Hf content than the cores and arms. The size of the script structures, as well as the relative amount of head-type to core and arm-type MC carbide, was found to be determined by solidification conditions. No carryover of the MC carbides from the ingot stock to the remelted and cast material was observed. Author

N82-30375*# Southampton Univ. (England).
THE METALLURGICAL STRUCTURE AND MECHANICAL PROPERTIES AT LOW TEMPERATURE OF NITRONIC 40 WITH PARTICULAR REFERENCE TO ITS USE IN THE CONSTRUCTION OF MODELS FOR CRYOGENIC WIND TUNNELS
D. A. Wigley Apr. 1982 66 p refs
(Contract NAS1-16000)
(NASA-CR-165907) Avail: NTIS HC A04/MF A01 CSCL 11F

Nitronic 40 was chosen for the construction of Pathfinder I, an R & D model for use in the National Transonic Facility, because of its good mechanical properties at cryogenic temperatures. Nitronic 40 contains delta ferrite and is in a sensitized condition. Heat treatments carried out to remove residual stresses also caused further sensitization. Experiments showed that heat treatment followed by cryoquenching removed the sensitization without creating residual stresses. Heat treatment at temperatures of 2200 F was used to remove the delta ferrite but with little success and at the cost of massive grain growth. The implications of using degraded Nitronic 40 for cryogenic wind tunnel models are discussed, together with possible acceptance criteria. S.L.

N82-30376 National Physical Lab., Teddington (England). Div. of Materials Applications.
THE SOLUTION COMPOSITION AND ELECTRODE POTENTIAL IN PITS, CREVICES AND CRACKS
A. Turnbull Mar. 1982 70 p refs
(NPL-DMA(A)-43; ISSN-0143-7313) Copyright. Avail: NTIS HC A04/MF A01

Experimental measurements from the literature on the solution composition and electrode potential in pits, crevices, and cracks are summarized for various metal/environment systems. For each system, the potential in the cavity is compared with the external potential, and the magnitude of the potential drop is discussed in terms of standard parameters, e.g., polarization characteristics of the metal and ease of mass transport. The pH values in the cavities are interpreted on the basis of the nature of the electrode reactions in the cavity and the hydrolysis of dissolved metal cations. Areas of uncertainty include corrosion fatigue cracks. The need for more systematic experimentation, especially when measuring pH in cavities in structural steels corroding in the active state, is stressed. Author (ESA)

N82-30377# Textron Bell Helicopter, Fort Worth, Tex.
SPUR GEAR LASER SURFACE HARDENING MM/T PROGRAM Final Report, Mar. 1979 - May 1981
W. Altergott and P. Patel Mar. 1982 122 p refs
(Contract DAAK51-79-C-0010)

(AD-A114670; USAAVRADCOM-TR-81-D-47) Avail: NTIS HC A06/MF A01

The purpose of this program was to surface harden spur gear specimens using laser and compare their tooth pitting life and tooth ending strength with that of carbuized AMS 6265 gears. The intent was to replace aircraft quality accessory drive carburized AMS 6265 gears with laser hardened gears and achieve significant cost savings. Preliminary work was conducted using 300M. Subsequently, 300M was replaced with D6AC because it failed to meet the requirement of Rc 60 minimum surface hardness after a 300 temper. Laser exposure curves were developed for both 300M and D6AC using flat disc type specimens. A unique system for splitting a laser beam into four beams and integrating the individual beams and directing these at the root and adjoining tooth flanks of tooth gap was developed. The main problems encountered were tempering of a previously hardened tooth flank, incomplete coverage from end face to end face and laser power and spatial drifts. The report presents a detailed description of the multi-beam laser heat treating station, metallurgical properties of D6AC, findings of the laser heat treating experiments, conclusions and recommendations for overcoming problems encountered. GRA

N82-30378# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.

TITANIUM SURFACE TREATMENTS FOR ADHESIVE BONDING Phase Report

S. R. Brown and G. J. Pilla 31 Mar. 1982 50 p refs (WF61542001)

(AD-A114710; NADC-82032-60) Avail: NTIS HC A03/MF A01 CSCL 13/8

The aircraft industry prepares titanium surfaces for adhesive bonding using various types of abrasive, etchant, chemical, and anodize treatments. A study was made to determine pretreatment effects on adhesive bond durability of titanium under severe environmental conditions of temperature, humidity, and stress. Replicate sets of Ti-6Al-4V titanium specimens were provided to aircraft manufacturers who prepared the sets using eleven different pretreatment processes. The manufacturers also bonded the specimens with the same four adhesive systems. Wedge specimens, bounded from 0.150-inch thick Ti-6Al-4V titanium were tested in a 140 F, 100% relative humidity atmosphere for a period of eight weeks. Chromic acid anodize, alkaline etch, chromate-fluoride and alkaline peroxide treatments resulted in substantially lower crack growth rates than phosphate-fluoride treatments. There was a slight difference in performance ranking of bonding pretreatments depending upon the adhesive system used. Author (GRA)

N82-30379# Naval Postgraduate School, Monterey, Calif.

AN ELECTROCHEMICAL INVESTIGATION OF CORROSION RATES FOR 1020 STEEL IN ENVIRONMENTS WHICH SIMULATE CONDITIONS IN MARINE REINFORCED CONCRETE M.S. Thesis

Dale Randolph Scott Jun. 1981 112 p refs

(AD-A114468) Avail: NTIS HC A06/MF A01 CSCL 07/4

An electrochemical investigation was conducted on the effects of varying the chloride and dissolved oxygen concentration on the corrosion rate of 1020 steel in a saturated calcium hydroxide solution. This solution was intended to simulate the conditions in marine reinforced concrete. The rate and mode of attack were studied electrochemically and microscopically. The electrochemical methods used were the Immersion Mass Loss (IML) Method, the Linear Polarization Method (LPM), the Potentiodynamic Polarization (PDP) Method, and the Potentiostatic Polarization (PSP) Method. The rates of corrosion obtained by each method were correlated to determine the corrosion rate of reinforcing steel in marine reinforced concrete. Microscopic examinations were made, using optical and scanning electron microscopy, to determine the mode of attack and the distribution of corrosion products. Author (GRA)

N82-30380# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.

MAGNETOSTRICTION AND CHARACTERIZATION OF BRIDGMAN GROWN RARE EARTH IRON ALLOYS Final Report

H. T. Savage and A. E. Clark 1 Nov. 1981 23 p refs Submitted for publication

(AD-A114948; AD-F500029; NSWC/TR-82-124) Avail: NTIS HC A02/MF A01 CSCL 11/6

We have prepared large samples of Tb sub .27 Dy sub .73 Fe sub 2 and Tb sub .2Ho sub .58 Dy sub .22 Fe sub 2 by Bridgman-like technique developed at United Technology. The samples have much larger values of saturation magnetostriction than vertically zoned materials. The materials have been characterized by metallographic and x-ray topography studies. Seeded growth resulted in a superior crystallographic orientation. Plane front growth was achieved over most of the boule. GRA

N82-30381# National Bureau of Standards, Washington, D.C.

THERMODYNAMICS OF HIGH TEMPERATURE MATERIALS Annual Report, 1 Oct. 1981 - 1 Apr. 1982

S. Abramowitz, A. Cezairliyan, F. Mies, and P. Julienne Sep. 1981 107 p refs

(Grant AF-AFOSR-ISSA-00012-81; AF Proj. 2306)

(AD-A114869; AFOSR-82-0380TR) Avail: NTIS HC A06/MF A01 CSCL 20/13

Heat capacity and electrical resistivity of graphite have been measured in the range of 2500 to 3600 K. Thermal expansion of tantalum has been measured in the range of 1500 to 3200 K. Radiance temperature (at 653 nm) of tungsten at its melting point has been determined. The enthalpy of graphite has been determined from 273 to 1173 K. The thermodynamic properties of diatomic molecules at elevated temperatures have been investigated and a formalism developed to include contributions from both the continuum states and the metastable states associated with rotational barriers. The determination of barriers to internal rotation for inorganic species has been reviewed. GRA

N82-30382# Aluminum Co. of America, Alcoa Center, Pa.

DEVELOPMENT OF STRUCTURE AND PROPERTIES OF 7050 AND 7475 ALLOYS DURING DIRECT EXTRUSION Final Report

T. H. Sanders, Jr. 1 Jun. 1981 160 p refs

(Contract N00019-77-C-0499)

(AD-A115043; Rept-56-80-AF10) Avail: NTIS HC A08/MF A01

The primary aim of the investigation was to explore the production and control of microstructures of 7050 and 7475 through variations in the temperature compensated strain rate, Z (Z = epsilon exp delta H/RT). The experimental design was constructed such that the results could be expressed in terms of the more traditional parameters: billet temperature, extrusion ratio, and section aspect ratio. Extremes in ram speed, extrusion ratio, and billet temperature were chosen such that the widest variation in Z and, therefore, the widest variation in microstructure could be achieved. Accordingly, 7050 and 7475 were direct extruded into round rod and rectangular bars on a 22.24 MN press. The microstructures were characterized in the solution heat treated and aged conditions as a function of temperature compensated strain rate, Z. Author

N82-30383# Rutgers - The State Univ., Piscataway, N. J. Coll. of Engineering.

DETERMINATION OF FATIGUE DAMAGE IN CORROSION-FATIGUED Al-2024-T4 AND CYCLED Ti-6Al-4V ALLOYS

T. Takemoto, K. L. Jing, T. Tasakalakos, S. Weissmann, and I. R. Kramer (Naval Ship Research and Development Center, Annapolis, Md.) Bethesda, Md. Naval Ship Research and Development Center May 1982 77 p refs

(Contract N00600-77-C-1134)

(AD-A115274; DTNSRDC-82/028) Avail: NTIS HC A05/MF A01 CSCL 11/6

X-ray double crystal diffractometer, transmission and scanning electron microscopy methods were employed to examine the cyclic deformation response of Al-2024-T4 in aqueous corrosive medium and the accrued fatigue damage in Ti-6Al-4V alloys. Special consideration was given to the cyclic response of surface and bulk properties. GRA

N82-30384# Cornell Univ., Ithaca, N. Y.

EQUATION OF STATE OF SIMPLE METALS Final Report, 15 Jan. 1978 - 14 Jan. 1982

A. L. Ruoff and N. W. Ashcroft 10 May 1982 36 p refs

(Contract DAAG29-79-C-0188)
(AD-A115279; Rept-8365-1; ARO-14638.6-MS) Avail: NTIS HC A03/MF A01 CSCL 07/4

This is the final report of A. L. Ruoff and N. W. Ashcroft on Equation of State of Simple Metals. It includes experimental equation of state results for potassium and theoretical calculations of its equation of state. Author (GRA)

N82-30385# Aluminum Co. of America, Alcoa Center, Pa.
EVALUATION OF THE ENGINEERING PROPERTIES OF A COMMERCIALLY PRODUCED ALUMINUM ALLOY 2020-T651 PLATE Final Report, 2 Jan. 1980 - 30 Jun. 1981
R. C. Malcolm, A. K. Vasudevan, R. J. Bucci, and P. E. Bretz 18 Dec. 1981 38 p refs
(Contract N00019-79-C-0258)
(AD-A115061) Avail: NTIS HC A03/MF A01 CSCL 11/6

Tensile, fracture toughness and fatigue crack growth properties obtained from a commercially produced lot of aluminum alloy 2020-T651 plate are summarized. This characterization serves as a baseline for alloy development work directed at improving damage tolerant characteristics of Al-Li type alloys. The fracture toughness characterization includes plane-strain fracture toughness (Klc) values, crack growth resistance (R) curves, as well as results from fracture toughness indicator tests, namely, the Kahn-type tear test and the slow bend precrack charpy test. Obtained fatigue crack growth rates traverse the entire range from near threshold values to the exceedingly high rates encountered as delta K values approach the material toughness. Metallographic characterization of alloy 2020-T651 in addition to fractographic results from a fatigue crack growth test specimen are also included. GRA

N82-30386# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
IMPROVED PENETRANT PROCESS EVALUATION CRITERIA Final Report, 1 Aug. 1980 - 31 Jul. 1981
J. S. Cargill and K. D. Smith Wright-Patterson AFB, Ohio AFWAL Oct. 1981 51 p refs
(Contract F33615-80-C-5060; AF Proj. 2418)
(AD-A115157; PWA-FR-15223) Avail: NTIS HC A04/MF A01 CSCL 11/6

The objective of this program is to investigate the significance of the improvements and modifications suggested in 'Methods Improvement of the Fluorescent Penetrant Inspection (FPI) Process.' The program is composed of three technical phases: (1) specimen preparation and baseline demonstration, (2) improved methods demonstration, and (3) statistical comparison of Phase I and Phase II. Author (GRA)

N82-30387# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
IMPEDANCE MEASUREMENT FOR THE ANALYSIS OF CORROSION INDUCED FAILURE Final Report, 30 Sep. 1980 - 30 Sep. 1981
Florian B. Mansfeld and Martin W. Kendig Warminster, Pa. NADC Feb. 1982 55 p refs
(Contract N62269-80-C-0291; WR02201001)
(AD-A115114; SC5287.5FR; NADC-80102-60) Avail: NTIS HC A04/MF A01 CSCL 06/11

Electrochemical techniques for predicting stress corrosion cracking (SCC) susceptibility have been evaluated and constant extension rate tests (CERT) have been performed for a C-Mn Steel (C1117) in 1 M Na3P04, pH = 4, T = 21 C and in 1.0 M NaHC03/0.1 M Na2C03, T = 70 C at controlled potentials with continuous recording of the a.c. impedance in a frequency range between 10 kHz and 30 mHz. These tests have been carried out in potential regions of susceptibility to SCC which were determined by comparing fast and slow anodic potentio-dynamic polarization curves as suggested by Parkins and by analysis of a.c. impedance data as suggested by Armstrong. The occurrence of a high frequency relaxation phenomenon at the potential region where maximum susceptibility to SCC is observed seems to indicate that impedance spectra can be used to assess the SCC behavior. A model for the surface reactions occurring during CERT and the resulting impedance behavior is discussed.
Author (GRA)

N82-30388# Naval Postgraduate School, Monterey, Calif.
USE OF IMPLANT TESTING TO EVALUATE THE SUSCEPTIBILITY OF HY-130 STEEL WELDMENTS TO HYDROGEN EMBRITTLEMENT M.S. Thesis
Bradley J. Mason Dec. 1981 108 p refs
(AD-A115199) Avail: NTIS HC A06/MF A01 CSCL 11/6

The cracking that may occur near the fusion zone of a steel weldment can often be attributed to the embrittlement of the microstructure by hydrogen induced during the welding process. The modified implant test was used in this case to evaluate the hydrogen-assisted cracking susceptibility of three separate heats of HY-130 steel, which included both cast and wrought plate. Welding was accomplished by the gas metal-arc spray transfer process. Cracking in all plates was observed to initiate and propagate in an area near the weld interface. The exact location of the fractures varied according to the amounts of diffusible hydrogen present and the type of material being tested. The effect of stress intensity together with hydrogen content on the mode of fracture present is also addressed in detail.
Author (GRA)

N82-30389# Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
DEFORMATION AND FRACTURE OF STRONGLY TEXTURED Ti ALLOY SHEET IN UNIAXIAL TENSION
K. S. Chan and D. A. Koss Apr. 1982 33 p refs
(Contract N00014-76-C-0037; NR Proj. 031-756)
(AD-A115409; TR-19) Avail: NTIS HC A03/MF A01 CSCL 11/6

The influence of crystallographic texture on the deformation and fracture behavior of strongly textured Ti alloy sheet has been investigated. Uniaxial tensile tests have been performed on Ti-6Al-4V and Ti-5Al-2.5 Sn sheet with either a basal or basal-transverse texture. The results indicate that, by controlling the ease of through-thickness slip, the crystallographic texture strongly affects the plastic of the material but has relatively little effect on the work-hardening rate and strain-rate sensitivity. A strong resistance to through-thickness slip, manifested by a high R-value, enhances the post-uniform elongation and the ability of the material to retain the load carrying capacity beyond maximum load. This behavior can be qualitatively understood in terms of the effect of R on the hardening which occurs as the strain state within the diffuse neck shifts from uniaxial tension toward plane strain. A higher R-value also increases significantly the limit strain at the onset of localized necking as well as the fracture strain. The effects of R-value on the limit strain can be qualitatively understood in terms of critical thickness strain criterion. Calculations of limit strains using an inclined imperfection model are also in good agreement with experimental results.
Author (GRA)

N82-30390# Pacific Northwest Lab., Richland, Wash.
INVESTIGATION OF SUSCEPTIBILITY OF TITANIUM-GRADE 2 AND TITANIUM-GRADE 12 TO ENVIRONMENTAL CRACKING IN A SIMULATED BASALT REPOSITORY ENVIRONMENT Interim Report
S. G. Pitman Oct. 1981 53 p refs
(Contract DE-AC06-76RL-01830)
(DE82-003233; PNL-3915) Avail: NTIS HC A04/MF A01

Slow strain rate tests and fatigue crack growth rate tests were used to evaluate the relative susceptibility of titanium (Ti)-grade 2 and -grade 12 to cracking in a simulated repository environment. Slow strain rate tests were performed in air and simulated Hanford basaltic groundwater at 250 C. Fatigue crack growth rate tests were done in Hanford groundwater, fluoride ion enhanced Hanford groundwater, and high purity water at 90 C. The following conclusions are drawn: Ti-grade 2 and Ti-grade 12 exhibited strain rate dependent degradation of ductility in slow strain rate tests at 250 C. In-air tests confirmed that the loss of ductility is not limited to the simulated repository environment and may be caused by an internal strengthening or embrittlement mechanism such as dynamic strain aging. The ductility degradation in Ti-grade 12 was found to be highly orientation dependent. (Only one orientation of grade 2 was tested). No fractographic evidence of an environmental cracking mechanism was found in the slow strain rate tests; all specimens failed by micro-void coalescence. The fatigue crack growth rate of Ti-grade 2 and -grade 12 was not affected relative to air or

high purity water by any of the environments used, and no frequency dependence was observed. DOE

N82-30391# Oak Ridge National Lab., Tenn.
CHANGES IN THE MECHANICAL PROPERTIES OF HASTELLOY X WHEN EXPOSED TO A TYPICAL GAS-COOLED REACTOR ENVIRONMENT
H. E. McCoy, Jr. 1981 23 p refs Presented at the Intern. Conf. on Environ. Degradation of Eng. Mater., Blackburg, Va., 21 Sep. 1981
(Contract W-7405-eng-26)
(DE81-030918; CONF-810913-8) Avail: NTIS HC A02/MF A01

The helium used in a gas cooled reactor will contain small amounts of H2, CO, CH4, H2O, and N2 which can lead to oxidation and carburization/decarburization of structural materials. Long term creep tests were run on Hastelloy X to 30,000 h at 649 to 871 C. It was found that extensive carburization occurred, the minimum creep rate and time to rupture were equal in air impure helium enviroments, and the fracture strain was less in helium than in air. Thermal exposure in the temperature range of 538 to 871 C resulted in the reduction of ductility in impact and tensile tests at ambient temperature, and this reduction was greater when the exposure was in impure helium rather than in air. A modified alloy with lower chromium and 2 percent titanium resisted carburization. DOE

N82-30392# Los Alamos Scientific Lab., N. Mex.
LOW-TEMPERATURE CHEMICAL-VAPOR DEPOSITION OF TUNGSTEN FROM TUNGSTEN HEXACARBONYL
Gerald J. Vogt 1981 15 p refs Presented at the 28th Natl. Symp. of the Am. Vacuum Soc., Anaheim, Calif., 3-6 Nov. 1981
(Contract W-7405-eng-36)
(DE82-000583; LA-UR-81-2681; CONF-811113-19) Avail: NTIS HC A02/MF A01

Chemical vapor deposition (CVD) of tungsten from W(CO)6 was investigated below 670 K as an alternate process to WF6 CVD for coating glass microspheres. The major advantages of W(CO)6 CVD are the elimination of the HF damage to the glass microspheres and potentially a lower deposition temperature for coating DT filled microspheres. W(CO)6 CVD can be utilized, in principle, to coat the microspheres with 1 to 5 m of tungsten or to flash coat the microspheres for further coating by WF6 CVD. Test coatings were deposited in a fluidized bed reactor with a hydrogen carrier gas. The coatings were found to contain nearly equal portions of carbon and oxygen, ranging from 16 to 25 at. % for each element. The high carbon and oxygen concentrations are believed to result principally from the physical entrapment of chemisorbed CO molecules at the surface of the growing deposit. DOE

N82-30393# California Univ., Livermore. Lawrence Livermore Lab. Chemistry and Materials Sciehce Dept.
TRITIUM STORAGE IN MOLECULAR SIEVES
John F. Lakner, G. Morris, and Susan Cooper 1 Oct. 1981 5 p refs Presented at the 9th Symp. on Eng. Problems of Fusion Res., Chicago, 26-29 Oct. 1981
(Contract W-7405-eng-48)
(DE82-003166; UCRL-86037; CONF-811040-77) Avail: NTIS HC A02/MF A01

Experiments with He2 and 85 Kr show that it is possible to encapsulate gases in the structure of certain molecular sieves. This method, if applicable to tritium, offers advantages in storage of tritium over some present methods, both for disposal and for temporary storage of tritium. Advantages of safety, isotope separation, and removal of He3 may be possible. Initial experiments were performed with H2 to screen potential candidates for use with tritium. DOE

N82-30394# California Univ., Livermore. Lawrence Livermore Lab.
DEVELOPMENT OF ADVANCED TECHNOLOGIES FOR PHOTOCHEMICAL TRITIUM RECOVERY Triquarterly Progress Report, 1 Oct. 1980 - 30 Jun. 1981
I. P. Herman and J. B. Marling 1 Sep. 1981 26 p refs
(Contract W-7405-eng-48)
(DE82-000842; UCID-18509-80-4-81-1-2) Avail: NTIS HC A03/MF A01

The CTC13 and CTBr3 working molecules were synthesized, and laser construction, photochemistry, and process engineering for T/D recovery began during this reporting period. DOE

N82-30395# SRI International Corp., Menlo Park, Calif.
ASSESSMENT OF MECHANICAL PROPERTY DEGRADATION OF STEELS EXPOSED TO PLBR LIQUID SODIUM Final Report, Aug. 1981
L. E. Eiselstein and R. H. Lamoreaux Aug. 1981 59 p refs
(EPRI Proj. 1704-15)
(DE82-900366; EPRI-NP-1985) Avail: NTIS HC A04/MF A01

A literature survey was conducted to investigate the feasibility of using ferritic instead of austenitic steels for certain components of a prototype pool large breeder reactor (PLBR). The primary concern is mechanical property degradation of PLBR components from sodium corrosion and carbon transport in sodium. The findings suggest that degradation occurs too slowly to affect the mechanical behavior of the components during the expected reactor lifetime, but a conclusive answer requires additional mechanical response data at longer exposure times and at temperatures representative of PLBR designs (i.e., below 773 K). DOE

N82-30396# Brookhaven National Lab., Upton, N. Y.
SCANNING ELECTRODE TECHNIQUES IN CORROSION
H. S. Isaacs and B. Vyas Jul. 1981 28 p refs Presented at the Tri-Service Corrosion Conf., Colorado Springs, 5 Nov. 1980
(Contract DE-AC02-76CH-00016)
(DE81-030826; BNL-30035; CONF-8011105-1) Avail: NTIS HC A03/MF A01

The principles, advantages, and implementations of scanning reference electrode techniques are reviewed. Data related to pitting, intergranular corrosion, welds and stress corrosion cracking are presented. The technique locates the position of localized corrosion and can be used to monitor the development of corrosion and changes in the corrosion rate under a wide range of conditions. DOE

N82-30397# Hanford Engineering Development Lab., Richland, Wash.
EDX MICROANALYSIS OF NEUTRON-IRRADIATED ALLOYS
L. E. Thomas Sep. 1981 15 p refs Presented at the 109th AIME Ann. Meeting Symp. on Advan. Tech. for the Characterization of Irradiated Metals, Las Vegas, Nev., Feb. 1980 Submitted for publication
(Contract DE-AC14-76FF-02170)
(DE81-030854; HEDL-SA-1916; CONF-800205-17) Avail: NTIS HC A02/MF A01

Energy-dispersive X-ray (EDX) spectrometry of 50 nm thick specimens in the scanning transmission electron microscope provides quantitative elemental analyses of selected regions as small as 20 nm in diameter. To analyze highly radioactive neutron-irradiated alloys it is necessary to reduce the high counting deadtimes caused by energetic gamma Compton scattering in the Si(Li) detector, and to account for spurious background contributions from gamma rays and characteristic X-ray emissions. Several simple methods for overcoming effects of specimen radioactivity are described, including use of a tungsten collimator to attenuate gamma and X-rays coming from the thick edges of self-supporting disk specimens. These methods allow analyses of Fe-Cr-Ni based alloys with gamma activities up to 1000 micron C/sub i/. Techniques used to maintain high spatial resolution and accuracy in quantitative analysis are also described, and their use is illustrated. DOE

N82-30398# Kernforschungsanlage, Juelich (West Germany). Inst. fuer Festkoerperforschung.
INVESTIGATION OF FRENKEL DEFECTS IN NICKEL AND NICKEL ALLOYS, USING DIFFUSE X RAY SCATTERING Ph.D. Thesis - Tech. Hochschule, Aachen [UNTERSUCHUNG VON FRENKELDEFEKTEN IN NICKEL UND NICKEL-LEGIERUNGEN MIT HILFE DER DIFFUSEN ROETGENSTREUUNG]
O. Bender Feb. 1982 124 p refs In GERMAN; ENGLISH summary

(JUEL-1769; ISSN-0366-0885) Avail: NTIS HC A06/MF A01

Single crystals of pure Ni and of the alloys Ni62Cu38 and Ni3Fe, as quenched (S = 0) or ordered (S = 0.7 to 0.9), were irradiated at 4.5 K with 3 MeV electrons. The irradiation induced defects were investigated by measurements of the Huang diffuse scattering of X-rays and the change of the lattice parameter and the electrical resistivity. At 6 K, statistically distributed Frenkel defects in all metals were observed. The configuration of the single interstitial atoms (SIA) in Ni agrees with the (100)-split configuration and there are no indications for different configurations of the SIA in the alloys. The relaxation volume of the SIA is 1.7 atomic volumes in Ni and 1.5 atomic volumes in Ni3Fe, independent of the degree of order. For the Frenkel defect resistivity, rho F, rho F = 6.1 micro-ohms cm in Ni, rho F = 7.2 micro-ohms cm in Ni3Fe (no difference between quenched and ordered samples), and rho F = 13.2 micro-ohms cm for Ni62Cu38 were found. Author (ESA)

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-30399*# California Univ., Riverside. Dept. of Chemistry.
PICOSECOND FLASH SPECTROSCOPIC STUDIES ON ULTRAVIOLET STABILIZERS AND STABILIZED POLYMERS Final Report
Gary W. Scott 23 Jun. 1982 46 p refs Sponsored in part by DOE
(Contract JPL-955671)
(NASA-CR-169211; NAS 1.26:169211; JPL-9950-697) Avail: NTIS HC A03/MF A01 CSCL 07C

Spectroscopic and excited state decay kinetics are reported for monomeric and polymeric forms of ultraviolet stabilizers in the 2-(2'-hydroxyphenyl)-benzotriazole and 2-hydroxybenzophenone classes. For some of these molecules in various solvents at room temperature, (1) ground state absorption spectra, (2) emission spectra, (3) picosecond time-resolved transient absorption spectra, (4) ground state absorption recovery kinetics, (5) emission kinetics, and (6) transient absorption kinetics are reported. In the solid state at low temperatures, emission spectra and their temperature dependent kinetics up to approximately 200K as well as, in one case, the 12K excitation spectra of the observed dual emission are also reported. S.L.

N82-30400*# Hughes Aircraft Co., Culver City, Calif.
STUDIES OF NEW PERFLUOROETHER ELASTOMERIC SEALANTS Final Contractor Report, 1 Oct. 1980 - 26 Sep. 1981
D. I. Basiulis and D. P. Salisbury Sep. 1981 105 p refs
(Contract NAS2-10334)
(NASA-CR-166377; NAS 1.26:166377; Rept-76-966; FR-81) Avail: NTIS HC A06/MF A01 CSCL 11A

Channel and filleting sealants were developed successfully from cyano and diamidoxime terminated perfluoro alkylene ether prepolymers. The prepolymers were polymerized, formulated and tested. The polymers and/or formulations therefrom were evaluated as to their physical, mechanical and chemical properties (i.e., specific gravity, hardness, nonvolatile content, corrosion resistance, stress corrosion, pressure rupture resistance, low temperature flexibility, gap sealing efficiency, tensile strength and elongation, dynamic mechanical behavior, compression set, fuel resistance, thermal properties and processability). Other applications of the formulated polymers and incorporation of the basic prepolymers into other polymeric systems were investigated. A cyano terminated perfluoro alkylene oxide triazine was formulated and partially evaluated. The channel sealant in its present formulation has excellent pressure rupture resistance and surpasses present MIL specifications before and after fuel and heat aging. S.L.

N82-30401*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DEPOSITION OF REACTIVELY ION BEAM SPUTTERED SILICON NITRIDE COATINGS
A. Grill (Ben Gurion Univ. of the Negev) Aug. 1982 11 p refs
(NASA-TM-82942; E-1310; NAS 1.15:82942) Avail: NTIS HC A02/MF A01 CSCL 11D

An ion beam source was used to deposit silicon nitride films by reactively sputtering a silicon target with beams of Ar + N2 mixtures. The nitrogen fraction in the sputtering gas was 0.05 to 0.80 at a total pressure of 6 to 2 millionth torr. The ion beam current was 50 mA at 500 V. The composition of the deposited films was investigated by auger electron spectroscopy and the rate of deposition was determined by interferometry. A relatively low rate of deposition of about 2 nm. one-tenth min. was found. AES spectra of films obtained with nitrogen fractions higher than 0.50 were consistent with a silicon to nitrogen ratio corresponding to Si3N4. However the AES spectra also indicated that the sputtered silicon nitride films were contaminated with oxygen and carbon and contained significant amounts of iron, nickel, and chromium, most probably sputtered from the holder of the substrate and target. S.L.

N82-30402# Northwestern Univ., Evanston, Ill. Dept. of Chemistry.
COFACIALLY LINKED METALLOMACROCYCLIC CONDUCTIVE POLYMERS. HALOGEN DOPANT LEVEL AND MACROMOLECULE ARCHITECTURE, ELECTRONIC STRUCTURE, AND CHARGE TRANSPORT Interim Report
B. N. Diel, T. Inabe, J. W. Lyding, K. F. Schoch, Jr., and C. R. Kannewurf 23 Dec. 1981 7 p refs
(Contract N00014-81-K-0445; Grant NSF DMR-79-23575)
(AD-A114726; TR-17) Avail: NTIS HC A02/MF A01 CSCL 11/9

This paper presents an integrated study of the nature of the halogen doping process for the cofacially joined electrically conductive metallomacrocyclic polymers (M(Pc)O)n, M equal Si,Ge,Sn; Pc equal phthalocyaninato. The properties of the ((M(Pc)O)bry)n and ((M(Pc)O)ly)n materials have been studied in detail as a function of y by X-ray diffractometry, infrared, optical, resonance Raman, EPR, four-probe van der Pauw, and static magnetic susceptibility. All data are in accord with a principally heterogeneous doping process. The sensitivity of the physical properties to M and interplanar (ring-ring) spacing is clearly evident. Author (GRA)

N82-30403# Pennsylvania State Univ., University Park. Materials Research Lab.
TARGETED BASIC STUDIES OF FERROELECTRIC AND FERROELASTIC MATERIALS FOR PIEZOELECTRIC TRANSDUCER APPLICATIONS Annual Report, 1 Dec. 1980 - 30 Nov. 1981
L. E. Cross, R. R. Newham, G. R. Barsch, and J. V. Biggers Nov. 1981 185 p refs
(Contract N00014-78-C-0291)
(AD-A114497) Avail: NTIS HC A09/MF A01 CSCL 20/3

This program on Targeted Basic Studies of Ferroelectric and Ferroelastic Crystals for Piezoelectric Transducer Applications is now in the fourth year of operation. Achievement over the past year have included: (1) The development of a correct phenomenology for electrostriction which leads to a Gibbs function which is invariant under simple body rotation. (2) Refinement of the full microscopic theory including temperature dependence of electrostriction in the important perovskite structure oxides. (3) Development of new processing methods for PbMg(7/3)Nb(2/3)O3 based relaxor ferroelectric compositions which eliminate the troublesome unwanted pyrochlore phase. (4) The design of new 1:3 and 2:3 connected PZT: polymer composites which have very high dhgh product and freedom from pressure dependence up to 1,000 psi pressure. (5) Crystal pulling of (Pb(1-x)Ba(x)Nb206 crystals at compositions close to the important morphotropic boundary. (6) A clear demonstration of the importance of piezoelectric grain resonance as the source of dielectric dispersion in LiNbO3 ceramics. (7) The development of an important new family of polar glass ceramics which are polar but non-ferroelectric and are poled by growth in a strong temperature gradient. Materials which combine high transverse coupling and low temperature coefficient of resonant frequency have been fabricated by this method. GRA

N82-30404# Naval Research Lab., Washington, D. C.
LIFE ENHANCEMENT OF NAVAL SYSTEMS THROUGH ADVANCED MATERIALS
A. I. Schindler and I. Wolock 12 May 1982 50 p refs
(AD-A114722; NRL-4807) Avail: NTIS HC A03/MF A01 CSCL 11/3

Recent progress in the development of advanced materials to extend the life of Naval systems is discussed. The developments include anti-corrosion and anti-fouling paints, improved lubricants, and more durable helicopter rotor blades, as well as a variety of materials processing techniques and improved uses of materials to reduce corrosion, wear and fatigue of systems components. Author (GRA)

N82-30405# Naval Research Lab., Washington, D. C.
FIRE-RESISTANT HYDRAULIC FLUIDS
J. B. Romans and R. C. Little 15 Jun. 1982 23 p refs
(AD-A115438; NRL-MR-4833) Avail: NTIS HC A02/MF A01 CSCL 11/8

In an attempt to select an appropriate fire-resistant hydraulic fluid for use in Naval applications two approaches were used (1) development of a shear-resistant drag reducing colloid dispersion presumed to be anti-misting and (2) use of water-in-oil emulsion loaded to high levels of water. While the dispersion of lithium phenylstearate colloid had demonstrated high drag reducing activity in previous work, it failed to produce the desired anti-misting effect characteristic of drag reducing agents at concentrations of 0.25, 0.50 and 1%. The water-in-oil emulsion, on the other hand, showed promising fire-resistant properties in a flammability testing device. Author (GRA)

N82-30406# Vought Corp. Advanced Technology Center, Inc., Dallas, Tex.
THE EFFECT OF ENVIRONMENT ON THE MECHANICAL BEHAVIOR OF KEVLAR/EPOXY MATERIALS Final Report, May 1980 - Sep. 1981
T. Ho and C. L. Cooper Mar. 1982 122 p refs
(Contract DAAG46-80-C-0037)
(AD-A115292; ATC-R-92000/1CR-60; AMMRC-TR-82-11) Avail: NTIS HC A06/MF A01 CSCL 11/9

Applicability of a viscoelastic characterization to Kevlar 49/5208 material under severe environment was investigated. Specific studies include development of properties reflecting material dependence on time, temperature and humidity and resolution of the question as to whether a specific thermal conditioning environment can be directly substituted for a specific moisture conditioning environment over a prescribed temperature vs. humidity range. Specimens with 0 deg, 90 deg and + or - 45 deg layup were used for creep-recovery tests in various environments. Test data were analyzed by using a viscoelasticity theory and power law representation of the creep compliance. Stress dependence of the material is emphasized to account for non-linearity. Author (GRA)

N82-30407# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Chemistry.
FIBROUS ORGANOSILICON POLYMERS DERIVED FROM SILICATES Interim Technical Report
Jesse Hefter and Malcolm Kenney 28 May 1982 15 p refs
(Contract N00014-75-C-0693; NR Proj. 356-590)
(AD-A115152; CWRU/DC/TR10) Avail: NTIS HC A02/MF A01 CSCL 07/2

A new, inherently fibrous organosilicon polymer having pendent trimethylsilyl groups is reported. It has been made from the rare ladder or tube silicate litidionite using a Lentz-type extraction-substitution process. The constituent fibers of this polymer have very small diameters, often 40-60 A, and are flexible and inert. They are believed to have frameworks closely related to that of the parent silicate ion. A polymer which appears to be the same as this one has been made from the synthetic silicate, $Na_2CuSi_4O_{10}$, a close structural analog of litidionite. In addition a related polymer carrying dimethylvinyl groups has been made from litidionite by a like Lentz-type procedure. Both silicates have been made by simple thermal procedures. Author (GRA)

N82-30408# Ultrasystems, Inc., Irvine, Calif. Chemicals and Materials Research Dept.
SYNTHESES OF PHOSPHATRIAZINES FOR POTENTIAL HIGH TEMPERATURE FLUIDS AND ELASTOMERS APPLICATIONS Final Report
K. L. Paciorek, T. I. Ito, J. H. Nakahara, D. H. Harris, and R. H. Kratzer 30 Apr. 1982 38 p refs
(Contract F49620-79-C-0037; AF Proj. 2303)
(AD-A115107; SN-8340-F; AFOSR-82-0414TR) Avail: NTIS HC A03/MF A01 CSCL 07/3

The symmetrical and unsymmetrical tetraazacyclooct-ooctatetraenes were found to be thermally less stable than the analogously substituted six-membered phospha-s-triazines. Both materials at 316 degrees C underwent transformation to phospha-s-triazines; the symmetrical arrangement giving diphospha-s-triazine and the corresponding nitrile; the unsymmetrical isomer forming monophospha-s-triazine and diphenylphosphazene trimer. No polymeric compounds could be synthesized having the symmetrical octatetraene ring arrangement as a chain component; only bicyclics were formed. Unsymmetrical polydiphosphatetraaza-cyclooctatetraenes having thermal and thermal oxidative stabilities directly comparable to those of their monomeric analogues were successfully prepared. GRA

N82-30409# National Bureau of Standards, Washington, D.C.
PROCEEDINGS OF THE ONR/NBS WORKSHOP CONTACT DAMAGE IN CERAMIC MATERIALS AT ELEVATED TEMPERATURES
Sheldon M. Wiederhorn 1 Apr. 1982 30 p refs Workshop held at Washington, D.C., 21-22 Jan. 1982
(Contract N00014-79-F-0019; NR Proj. 032-535)
(AD-A115275) Avail: NTIS HC A03/MF A01 CSCL 11/2

This report summarizes the results of a workshop held on the subject, Contact Damage in Ceramic Materials at Elevated Temperatures, at the National Bureau of Standards on January 21-22, 1982. The object of the Workshop was to assess the current state of understanding of contact phenomenon in ceramic materials and to identify likely areas of research for future studies. This report contains a summary of the meeting, suggestions for future study and a list of abstracts provided by the individual authors. Author (GRA)

N82-30410# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
CHEMICAL DURABILITY IMPROVEMENT AND STATIC FATIGUE OF GLASSES Annual Report, 1 Feb. 1981 - 30 Apr. 1982
Minoru Tomozawa May 1982 43 p refs
(Contract N00015-78-C-0315)
(AD-A115318; AR-4) Avail: NTIS HC A03/MF A01 CSCL 11/2

Series of investigations were made on the relation between the surface conditions of high silica glass and its mechanical strength. It was found that, (1) Heavy alkaline-earth elements such as Sr Ba in alkaline solutions tend to deposit on the silica glass surface and produce severe surface cracks, reducing the mechanical strength. (2) Surface energy of the glass appears to determine the mechanical strength of high silica glass. (3) Dissolution rate of high silica glass in water increases with increasing hydrostatic pressure. This appears inconsistent with the stress-corrosion theory. (4) Crack blunting of high silica glass involves dissolution and precipitation process. (5) Surface condition of high silica glass influences the stress-rate dependence of the mechanical strength. Author (GRA)

N82-30411# New York Univ., N. Y. Dept. of Applied Science.
ROOM TEMPERATURE CURING EPOXY RESIN COMPOSITIONS HIGH TEMPERATURE SERVICE CAPABILITY FOR FIBER REINFORCED STRUCTURES, ADHESIVES AND SEALANTS Final Report, 1 Jul. 1979 - 30 Jun. 1980
Walter Brenner and Josef Arnon Jun. 1981 64 p refs
(Contract N00019-79-C-0513)
(AD-A115025; NYU/DAS-81-02) Avail: NTIS HC A04/MF A01 CSCL 11/9

Room temperature curing epoxy resin compositions with high temperature service capability based on selected high functionality epoxy polymers and multicomponent curing agent systems were formulated and evaluated as binders for glass fiber reinforced laminates, adhesives and sealants. Experimental data have been developed which show that certain suitably formulated two-

component epoxy resin compositions can be employed to prepare glass fiber reinforced composites for service up to 200 C. Their high temperature performance capability significantly exceeds that of other commercially available room temperature curing systems such as polyesters and acrylics. Data are also presented on similarly formulated adhesive compositions which show promise for usage over an exceptionally wide temperature range.
Author (GRA)

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-30412*# Aerojet Liquid Rocket Co., Sacramento, Calif.
COMBUSTION PERFORMANCE AND HEAT TRANSFER CHARACTERIZATION OF LOX/HYDROCARBON TYPE PROPELLANTS. TASK 3: DATA DUMP Progress Report
S. W. Hart Jul. 1982 202 p refs
(Contract NAS9-15958)
(NASA-CR-167714; NAS 1.26:167714) Avail: NTIS HC A10/MF A01 CSCL 21I

A preliminary characterization of Orbital Maneuvering System (OMS) and Reaction Control System (RCS) engine point designs over a range of thrust and chamber pressure for several hydrocarbon fuels is reported. OMS and RCS engine point designs were established in two phases comprising baseline and parametric designs. Interface pressures, performance and operating parameters, combustion chamber cooling and turboprop requirements, component weights and envelopes, and propellant conditioning requirements for liquid to vapor phase engine operation are defined.
Author

N82-30413# Committee on Science and Technology (U. S. House).
SYNTHETIC FUELS ENVIRONMENTAL RESEARCH AND DEVELOPMENT
Washington GPO 1982 238 p refs Hearing before the Subcomm. on Energy Develop. and Appl. and the Subcomm. on Nat. Resources, Agr. Res. and Environ. of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., no. 65, 1 Oct. 1981
(GPO-89-263) Avail: Subcommittee on Energy Development and Applications

The environmental effects of process streams from synthetic fuels plants and process improvements being investigated to minimize the presence of hazardous materials in the process streams are reviewed. The environmental protection research being performed by industry, measures for the protection and monitoring of worker health, and what industry sees as the major developmental unknowns in synthetic fuels process development were discussed. The benefits and limitations of federal research and development programs in the Department of Energy and the Environmental Protection Agency were considered. Recommendations for the improvement of these programs for the benefit of both the public health and the synthetic fuels industry were presented.
J.D.

N82-30414# Suntech, Inc., Marcus Hook, Pa.
THE PREPARATION AND CHARACTERIZATION OF MIXTURES OF POLYCYCLOPENTADIENES AS SOLID RAMJET FUELS Final Report, 17 Jun. 1980 - 30 Jun. 1981
A. Schneider, L. W. Hall, Jr., and E. J. Janoski 15 Apr. 1982 18 p refs
(Contract N00019-80-C-0277)
(AD-A115075) Avail: NTIS HC A02/MF A01 CSCL 07/3

Conditions for the thermal polymerization of cyclopentadiene to tetracyclopentadienes and higher molecular weight oligomers are given for both neat and solution polymerization modes. Density and volumetric heats of combustion are given for the mixtures of oligomers formed under different conditions. Compatibilities of oligomers with hydroxyl terminated polybutadiene (HTPB) are given.
Author (GRA)

N82-30415# Studsvik Energiteknik A.B., Nykoping (Sweden).
BIOPULVER - BIOMASS POWDER. A TECHNICAL AND ECONOMIC COMPARISON WITH OTHER FUELS
Patric Janson and Karin Segerud Oct. 1980 104 p In SWEDISH
(DE82-901027; STUDSVIK/EP-80-23) Avail: NTIS (US Sales Only) HC A06/MF A01; DOE Depository Libraries

The techniques and cost of the manufacture, distribution, and use of biomass powder are discussed parallel to competitive fuels. A comparison is made, projected to around the year 1990. Biomass powder seems to become competitive in large boilers of 0.5 - 5 Mw which have short operating cycles and must be controlled. The ability to compete with other fuels is judged to be best in the regions with a good supply of straw.
DOE

N82-30416# Oak Ridge National Lab., Tenn.
MOONSHINE TO MOTOR FUEL: A WORKSHOP ON REGULATORY COMPLIANCE FOR FUEL ALCOHOL PRODUCTION
M. S. Salk, ed., F. E. Sharples, ed., and J. F. McBrayer, ed. Oct. 1981 310 p refs Workshop held at Atlanta, 3 Mar. 1981
(Contract W-7405-eng-26)
(DE82-001358; CONF-810303-3) Avail: NTIS HC A14/MF A01

Alcohol fuels - past and present, alcohol fuels from biomass, economic regulatory issues, environmental regulatory issues, and health and safety regulatory issues are presented. Production of ethanol from starch based or sugar based feedstocks results in significant biological or chemical waste streams. The volume and waste loading in the effluent varies, depending on the degree of by-product recovery or water recycle in the production process. Within the production facility, the following areas result in effluents which can be treated either for by-product recovery or as a waste stream: feedstock/mash production; mash fermentation; distillation; plant cleanup; and accidents.
DOE

N82-30417# Illinois Univ., Urbana. Dept. of Civil Engineering.
BIOLOGICAL CONVERSION OF BIOMASS TO METHANE Final Report, 1 Jan. 1980 - 31 Mar. 1981
Paul N. McFarlane and John T. Pfeffer Jul. 1981 160 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-003928; SERI/TR-98357-1) Avail: NTIS HC A08/MF A01

The production of a fuel gas by the anaerobic digestion of crop residues is economically unattractive because of the poor conversion efficiencies experienced with high rate methane fermentation processes. Pretreatment of the residue prior to fermentation substantially improves the biodegradability of the ligno-cellulose fibers. Thermochemical pretreatment using NaOH at temperatures up to 200 C is effective for laboratory scale studies. The effectiveness of this pretreatment was evaluated using 0.775 cu m methane fermentation reactors. A minimum feed slurry solids concentration of five percent was used. Pretreatment conditions tested include NaOH concentrations ranging from 1.33 to 13.3% by weight, treatment temperature ranging from 106 to 160 C, solids concentration during pretreatment ranging from 16.8 to 33.2% and pretreatment time ranging from 0.316 to 3.16 hours.
DOE

N82-30418# Department of Energy, Bartlesville, Okla. Energy Technology Center.
LIQUID FOSSIL FUEL TECHNOLOGY Quarterly Technical Progress Report, Jan. - Mar. 1981
Bill Linville, ed. Aug. 1981 70 p refs
(DE82-003270; DOE/BETC/QPR-81/1) Avail: NTIS HC A04/MF A01

Liquid fossil fuel cycle is discussed. Extraction techniques which are subdivided into resource assessment and production, liquid processing which includes characterization of liquids from petroleum, coal, shale and other alternate sources, thermodynamics and process technology; utilization; and project intergration and technology transfer are summarized.
DOE

N82-30419# Exxon Research and Engineering Co., Linden, N.J.
FUNDAMENTAL CHARACTERIZATION OF ALTERNATE-FUEL EFFECTS IN CONTINUOUS COMBUSTION SYSTEMS

Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
R. M. Kowalik and L. A. Ruth Jul. 1981 15 p refs
(Contract DE-AC22-77ET-11313)
(DE82-002802; DOE/ET-11313/7) Avail: NTIS HC A02/MF A01

Recent efforts have involved the modification/shakedown of the variable pressure jet-stirred combustor (VPJSC), the design and construction of a facility for the measurement of liquid fuel spray droplet size distributions, and fuel nitrogen conversion experiments in the jet-stirred combustor. Progress in the above areas is discussed, including details of VPJSC air and fuel system modifications and corresponding checkout experiments, a description of the spray facility and planned experiments therein, and revisions/improvements in the fuel nitrogen conversion measurement procedures and run condition test matrix. DOE

N82-30420# Exxon Research and Engineering Co., Linden, N.J. Systems Advancement and Transfer Div.
FUNDAMENTAL CHARACTERIZATION OF ALTERNATE-FUEL EFFECTS IN CONTINUOUS-COMBUSTION SYSTEMS Quarterly Progress Report, 1 Jul. - 30 Sep. 1981
R. M. Kowalik and L. A. Ruth Oct. 1981 11 p
(Contract DE-AC22-77ET-11313)
(DE82-002946; DOE/ET-11313/8) Avail: NTIS HC A02/MF A01

The overall objective of this research program is to assist in the development of fuel-flexible combustion systems which can accommodate future alternate fuels derived from non-petroleum resources, with particular emphasis on liquid hydrocarbon fuels and gas turbine combustors. The program is divided into coordinated experimental and analytical efforts. The objectives of the experimental program are to obtain improved understanding of the relationships among soot production, fuel nitrogen conversion, fuel properties, and combustor operating conditions in highly backmixed systems and to provide a data base for the development of corresponding analytical models/correlations. The approach has been to study soot production and fuel nitrogen conversion processes in several jet-stirred combustors. The objective of the analytical program is to provide modeling/correlation capabilities which can be used as design aids for the development of fuel-tolerant combustion systems. DOE

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-30421# Oak Ridge National Lab., Tenn. Regional and Urban Studies Section.
A PROPOSED NEW HANDBOOK FOR THE FEDERAL EMERGENCY MANAGEMENT AGENCY: RADIATION SAFETY IN SHELTERS
Carsten M. Haaland Sep. 1981 146 p refs Prepared for Federal Emergency Management Agency, Washington, D.C.
(Contract W-7405-eng-26)
(ORNL-5766) Avail: NTIS HC A07/MF A01

A proposed replacement for the portion of the current Handbook for Radiological Monitoring that deals with protection of people in shelters from radiation from fallout resulting from nuclear war is presented. Basic information at a high school level is given on how to detect nuclear radiation, how to find and improve the safest places in a shelter, the necessity for and how to keep records on individual radiation exposures, and how to minimize exposures. Several procedures are introduced, some of which are based more on theoretical considerations than on actual experiments. These procedures include: (1) the method of time averaging radiation readings taken with one instrument in different locations of a large shelter while fallout is coming down and radiation levels ar climbing too rapidly for direct comparison of readings to determine the safest location; (2) the method of using one's own body to obtain directionality in radiation readings taken with a standard Civil Defense survey meter; (3) the method of using mutual shielding to reduce the average radiation exposure to shelter occupants; and (4) the ratio method for estimating radiation levels in hazardous areas. Author

N82-30422# EG and G Washington Analytical Services Center, Inc., Rockville, Md.
VALIDATION OF COMPUTER MODELS OF CABLE SYSTEM DYNAMICS Final Report, May 1980 - May 1981
David B. Dillon Port Hueneme, Calif. Naval Civil Engineering Lab. Apr. 1982 191 p refs
(Contract N68305-80-C-0020; YF50556091)
(AD-A114957; NCEL-CR-82.015) Avail: NTIS HC A09/MF A01 CSCL 13/10

During the week of 23 to 27 January 1978 , a survey team from the USAF Occupational and Environmental Health Laboratory conducted an analysis of maintenance tasks associated with the F-16 Emergency Power Unit (EPU). This analysis involved definition of tasks for both aircraft and hydrazine fill stand activities and included the collection of personal and short period air samples to define airborne exposure to hydrazine during these tasks. The tasks which were identified include: nitrogen depressurization, catalyst purge, poppet valve replacement and the entire refilling procedure. Measurements indicate compliance with a Time Weighted Average value of 0.1 ppm hydrazine, however, potential peak exposures which range as high as 5 to 8 ppm do occur during some tasks. A technician would be unaware of many such exposures since concentrations below the odor threshold of 3 to 5 ppm give no warning but are at least an order of magnitude above acceptable occupational exposure limits. Recommendations are provided for the elimination of these sources of potential peak exposure and for the use of personal protective equipment during specific tasks. Author (GRA)

N82-30423# National Bureau of Standards, Washington, D.C. Fracture and Deformation Div.
EFFECT OF CONTACT DAMAGE ON THE STRENGTH OF CERAMIC MATERIALS Annual Report, 1 Oct. 1980 - 30 Sep. 1981
S. M. Wiederhorn, B. J. Hockey, and J. S. Nadeau Oct. 1981 73 p refs
(Contract N00014-81-F-0002)
(AD-A115288) Avail: NTIS HC A04/MF A01 CSCL 11/2

The results of a program to investigate mechanisms of contact damage in ceramic materials at elevated temperatures are presented. The effect of this damage on the strength and wear of ceramic materials was also determined. R.J.F.

N82-30424# Army Construction Engineering Research Lab., Champaign, Ill.
VALIDATION DATA FOR MECHANICAL SYSTEM ALGORITHMS USED IN BUILDING ENERGY ANALYSIS PROGRAMS Final Report
William Dolan Feb. 1982 177 p
(Contract IAA-EM-78-1-01-4207)
(AD-A115182; CERL-TR-E-177) Avail: NTIS HC A09/MF A01 CSCL 13/1

This report describes a study which collected data developers can use to validate the algorithms used by building energy analysis computer programs to model system and central plant performance of typical heating, cooling, and ventilating (HVAC) systems. Building energy analysis programs compute (1) loads imposed on building environmental control systems for each zone, (2) loads imposed on central equipment (using the zone loads and system performance algorithms), and (3) the primary energy demanded by the central- and zone-specific components. The information collected during this study made it possible to compare actual system performances with computer-generated results of system performances. In addition, this study identified some problems common to HVAC systems, including (1) often unreliable controls performance such as drifting away from calibration and poor repeatability, and (2) as-delivered components which do not operate at manufacturers' specifications. GRA

N82-30425# California Univ., Livermore. Lawrence Livermore Lab.
LEVITATION, COATING, AND TRANSPORT OF PARTICULATE MATERIALS Final Report
C. D. Hendricks 12 Oct. 1981 15 p Presented at the Ann. Meeting of the Mater. Res. Soc., Boston, 16-19 Nov. 1981
(Contract W-7405-eng-48)
(DE82-002578; UCRL-86117; CONF-811122-10) Avail: NTIS HC A02/MF A01

Several processes in various fields require uniformly thick coatings and layers on small particles. The particles may be used as carriers of catalytic materials (platinum or other coatings), as laser fusion targets (various polymer or metallic coatings), or for biological or other tracer or interactive processes. We have devised both molecular beam and electro-dynamic techniques for levitation of the particles during coating and electrodynamic methods of controlling and transporting the particles between coating steps and to final use locations. Both molecular beam and electrodynamic techniques are described and several advantages and limitations of each will be discussed. DOE

N82-30426# Louisiana State Univ., Baton Rouge. Energy Programs Office.
TECHNICAL SUPPORT FOR GEOPRESSURED-GEOTHERMAL WELL ACTIVITIES IN LOUISIANA Final Report, 27 Sep. 1978 - 31 Dec. 1980
F. M. Wrighton, Don Debout, Dale R. Carver, Charles C. Groat, and Adrain E. Johnson, Jr. 31 Aug. 1981 215 p
(Contract DE-AS05-78ET-27160)
(DE82-000498; DOE/ET-27160/T1) Avail: NTIS HC A10/MF A01

The data analysis is based on the Brazoria Texas well and the balance of the modeling work is theoretical. Progress in the regional assessment of the geopressured-geothermal resource in Louisiana is reported. Environmental monitoring effort established monitoring systems and baseline environmental measurements. Efforts to improve the technoeconomic model, improve the estimates of methane in solution, and to evaluate newly identified sites are described. DOE

N82-30427# Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium). Construction Mecanique Section.
INTRODUCTION TO NUMERICAL CONTROL OF MACHINES [INTRODUCTION A LA COMMANDE NUMERIQUE DES MACHINES]
Jan Blommaert, Hilaire Coeckelberghs, Willy DuMong, Philippe Gaudissart, Jos Pinte, and Luc Soete Dec. 1981 229 p refs In FRENCH Sponsored by Inst. pour l'Encouragement de la Recherche Scientifique dans l'Industrie et l'Agriculture
(CRIF-MC-71) Avail: NTIS HC A11/MF A01

Functional principles of closed loop numerical control and different machines susceptible to this control technique are discussed. The design of a numerical control box is considered. Sensors and methods of industrial measurement are described. Programming numerically controlled machine jobs and programming part specificationsare treated. Setting upalathingoperation is explained to show how theory can be put into practice. A numerically controlled press folding setup is also depicted.
Author (ESA)

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-30428 British Broadcasting Corp., Kingswood (England). Engineering Div.
DIGITAL STANDARDS CONVERSION: COMPARISON OF COLOUR DECODING METHODS
C. K. P. Clarke Jun. 1982 24 p refs
(BBC-RD-1982/6) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

A number of PAL and NTSC decoding methods, several of which involve comb filters based on line delays, are compared, primarily for use in standards conversion. To simplify comparisons, the circuits are all converted into a general form consisting of a chrominance pass filters, used to obtain luminance and a chrominance demodulator. The theoretical performance of each circuit is summaried as a set of vertical frequency characteristics which show luminance and chrominance resolution, cross luminance and cross color and, where present, other crosstalk and aliasing effects. In addition, practical impressions of the performance of each method were obtained from a fully decoder using line-locked sampling and switched filters. The optimum PAL decoding arrangements for direct viewing, for subsequent recoding to PAL and for standards conversion are all found to be different. For direct viewing, a two line luminance circuit with nulls to reject subcarrier components, combined with a two line version of the conventional delay line chrominance circuit produces the most acceptable pictures. S.L.

N82-30429 British Broadcasting Corp., Kingswood (England). Engineering Div.
COLOUR SEPARATION OVERLAY AND ITS RELATION TO DIGITAL VIDEO SAMPLING
A. Oliphant Jun. 1982 12 p refs
(BBC-RD-1982/7) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

Current techniques for color separation overlay (CSO) are briefly described. The influence of CSO techniques on the formulation of standards for digital video sampling parameters is discussed and experiments are described which investigated the effects on CSO pictures of filtering and sampling the foreground picture signals. The conclusions are that a chrominance (UV) bandwidth of at least 3 MHz, (implying a sampling frequency of at least 6 MHz) is needed for satisfactory CSO whereas luminance (Y) sampling frequency need not be constrained by CSO considerations. Hence a YUV sampling frequency standard of 13.5, 6.75, 6.75 MHz appears to be commensurate with good-quality CSO. This investigation into digital video sampling parameters formed part of the evidence on which the 13.5:6.75:6.75 system was chosen for digital video sampling.
Author

N82-30430*# EMACO, San Diego, Calif.
VLF RADIO FIELD STRENGTH MEASUREMENT OF POWER LINE CARRIER SYSTEM IN SAN DIEGO, CALIFORNIA Final Report
Herbert K. Mertel 15 Oct. 1981 79 p refs
(Contract JPL-955952)
(NASA-CR-169244; NAS 1.26:169244; JPL-9950-689; EMACO-8101-10) Avail: NTIS HC A05/MF A01 CSCL 20N

The radio frequency interference (RFI) potential was evaluated for a Powerline Carriet (PLC) installed in San Diego which monitors the performance of an electrical power system. The PLC system generated 30 amperes at 5.79 kHz. The RF radiations were measured to be (typically) 120 dBuV/m at the beginning of the 12 kV powerline and 60 dBuV/m at the end of the powerline. The RF fields varied inversely as the distance squared. Measurements were also performed with a 45 kHz PLC system. The RF fields were of similar amplitude. Author

N82-30431*# Ford Aerospace and Communications Corp., Palo Alto, Calif. Western Development Labs. Div.
TELEVISION BROADCAST FROM SPACE SYSTEMS: TECHNOLOGY, COSTS Final Report, 2 Aug. 1980
C. Louis Cuccia 1 Jul. 1981 773 p refs Revised
(Contracts NAS7-100; JPL-955641)
(NASA-CR-169247; NAS 1.26:169247; JPL-9950-702) Avail: NTIS HC A99/MF A01 CSCL 17B

Broadcast satellite systems are described. The technologies which are unique to both high power broadcast satellites and small TV receive-only Earth terminals are also described. A cost assessment of both space and Earth segments is included and appendices present both a computer model for satellite cost and the pertinent reported experience with the Japanese BSE.
S.L.

N82-30432*# Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
THE INTERACTION OF RADIO FREQUENCY ELECTROMAGNETIC FIELDS WITH ATMOSPHERIC WATER DROPLETS AND APPLICATIONS TO AIRCRAFT ICE PREVENTION Thesis
Robert John Hansman, Jr. Jun. 1982 193 p refs
(Grants NAG1-100; NGL-22-009-640)
(NASA-CR-169246; NAS 1.26:169246; FTL-R82-5) Avail: NTIS HC A09/MF A01 CSCL 20N

The feasibility of computerized simulation of the physics of

advanced microwave anti-icing systems, which preheat impinging supercooled water droplets prior to impact, was investigated. Theoretical and experimental work performed to create a physically realistic simulation is described. The behavior of the absorption cross section for melting ice particles was measured by a resonant cavity technique and found to agree with theoretical predictions. Values of the dielectric parameters of supercooled water were measured by a similar technique at lambda = 2.82 cm down to -17 C. The hydrodynamic behavior of accelerated water droplets was studied photograhically in a wind tunnel. Droplets were found to initially deform as oblate spheroids and to eventually become unstable and break up in Bessel function modes for large values of acceleration or droplet size. This confirms the theory as to the maximum stable droplet size in the atmosphere. A computer code which predicts droplet trajectories in an arbitrary flow field was written and confirmed experimentally. The results were consolidated into a simulation to study the heating by electromagnetic fields of droplets impinging onto an object such as an airfoil. It was determined that there is sufficient time to heat droplets prior to impact for typical parameter values. Design curves for such a system are presented. J.D.

N82-30433*# National Aeronautics and Space Administration, Washington, D. C.

REPORT OF SURVEY RESEARCH OF WAYS OF USING SECOND GENERATION PRACTICAL BROADCASTING SATELLITES

Jul. 1982 60 p Transl. into ENGLISH of "Daini Sedai no Jitsuyo Hoso Eisei no Riyo no Arikata ni Kansuru Chosa Kenkyu Hokokusho" Japan, Mar. 1978 78 p Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Denpa Riyo Kaihatsu Chosa Kenkyukai Jitsuyo Buka, Tokyo
(Contract NASw-3541)
(NASA-TM-76912; NAS 1.15:76912) Avail: NTIS HC A04/MF A01 CSCL 17B

The state of development of satellite broadcasting in Japan, was determined and recommendations were made regarding what organizations would use it and what kind of results could be forthcoming. The primary use at this stage is for television broadcasting, and the secondary use is for testing new broadcasting methods and for use by Japan's new Broadcasting University. S.L.

N82-30434# Royal Aircraft Establishment, Farnborough (England). Radio and Navigation Dept.

SIMPLE METHODS FOR CALCULATING THE AZIMUTHAL COVERAGE OF HF DIRECTIONAL ANTENNAS

G. May Feb. 1981 26 p refs
(RAE-TR-81018; BR78128; Rad-Vav-104) Avail: NTIS HC A03/MF A01

The aximuthal coverage of HF directional antennas are calculated and examples are given. Sperical trigonometry formulas employing auxiliary quantities are emphasized because of their suitability for use with simple hand held electronic calculators. The relationships between sides and angles of oblique spherical triangles, collated from several sources, are listed and the value of applying tests based on these relationships prior to making detailed solutions of spherical triangle problems is demonstrated. S.L.

N82-30435# Clarkson Coll. of Technology, Potsdam, N.Y. Dept. of Mathematics.

NONLINEAR WAVE PROPAGATION Annual Technical Report

Mark J. Ablowitz 25 Nov. 1981 36 p refs
(Grant AF-AFOSR-3674-78; AF Proj. 2304)
(AD-A114853; AFOSR-82-0396TR) Avail: NTIS HC A03/MF A01 CSCL 20/14

The basic direction underlying this work is the continuing study of certain fundamental features associated with the nonlinear wave propagation which are motivated and arises in physical problems. The usefulness of the work is attested to by the varied applications, and wide areas of interest in physics, engineering and mathematics. The work accomplished relates to fluid mechanics, nonlinear optics, multidimensional solitons, Painleve equations, long time asymptotic solutions, new linearizations of the KdV equation, Riemann-Hilbert problems, etc. GRA

N82-30436# Atlantic Research Corp., Alexandria, Va.

INTRASYSTEM ANALYSIS PROGRAM (IAP) MODEL IMPROVEMENT Final Technical Report, Jun. 1979 - Dec. 1981

Thomas E. Baldwin, William G. Duff, James J. Foster, Richard G. Robinson, Harvey K. Schumann, and Mildred K. Bartley Griffiss AFB, N. Y. RADC Feb. 1982 358 p refs
(Contract F30602-79-C-0169; AF Proj. 2338)
(AD-A114752; RADC-TR-82-20) Avail: NTIS HC A16/MF A01 CSCL 20/3

The Intrasystem Electromagnetic Compatibility Analysis Program (IEMCAP) is a system level, computerized analysis program which may be used in analyzing electromagnetic compatibility (EMC) for aircraft, spacecraft or ground stations on both present and future systems. The objective of this effort was to increase the prediction capability of the IEMCAP. The defined tasks to obtain the new capability are the following: (1) development of a frequency dependent power gain antenna model for IEMCAP; (2) modify IEMCAP to predict the electromagnetic (EM) interference for those devices whose compatibility is not related to average power; (3) implement within IEMCAP a mathematical model(s) to predict the degradation to receptors of EM energy, caused by spurious signal products generated at an emitter, a structural nonlinearity (i.e., in the transmission path), or in a victim receptor (i.e., signal harmonics, intermodulation, cross modulation, desensitization, gain compression/expansion and spurious responses); and (4) modification of the modeling procedure for a port's emission and/or susceptibility. Upon completion of the above modeling effort, the developed models were to be coded and interfaced with the existing IEMCAP. GRA

N82-30437# Analysis and Technology, Inc., North Stonington, Conn.

UTILIZATION OF AN/APS-94 SIDE-LOOKING AIRBORNE RADAR SYSTEMS IN SEARCH AND RESCUE Interim Report, Jan. 1978 - Apr. 1982

S. R. Osmer, L. Nash, G. L. Hover, and T. J. Mazour Apr. 1982 23 p refs
(Contract DTCG39-81-C-80287)
(AD-A114484; USCG-D-14-82; CGR/DC-3/82) Avail: NTIS HC A02/MF A01 CSCL 17/9

Since September 1978, side-looking airborne radar (SLAR) detection data have been gathered in conjunction with visual detection experiments conducted by the U.S.C.G. R&D Center. These are part of a series of experiments designed to improve search planning guidance contained in the National Search and Rescue Manual. HC-130 aircraft, equipped with either the Airborne Oil Surveillance system (AOSS) or SLAR/radar image processor (SLAR/RIP) configuration of the AN/APS-94C or D SLAR, conducted controlled searches for life rafts, small boats, and 41-to 95-foot Coast Guard vessels. Through the use of a microwave tracking system and SLAR data, the positions of searchers and targets were accurately reconstructed to facilitate the verification of detections on SLAR films or video tape. These data were used to evaluate the effects of environmental and controllable parameters on SLAR detection of the various target types. Of the 12 parameters investigated, target size/composition, search altitude, swell height, wind speed, and humidity/precipitation were found to have a significant influence on SLAR detection performance. Sweep widths for SLAR search and recommendations for SLAR utilization in SAR missions are included. In addition, recommendations for future SLAR evaluation are made. Author (GRA)

N82-30438# Naval Postgraduate School, Monterey, Calif.

SHIFT AND SCALE INVARIANT PREPROCESSOR M.S. Thesis

Norman Earl Huston, Jr. Dec. 1981 135 p refs
(AD-A114519) Avail: NTIS HC A07/MF A01 CSCL 17/9

A preprocessor is designed to extract a set of features that enhance natural clustering by removing extraneous information. The design removes time shift and scale dependence by taking advantage of invariant properties of a Fourier transform followed by a Mellin transform. The preprocessor is realized using an FFT and a Mellin transform with a conventional error correction term. The error term proves to be indeterminate, but the error's bound is identified as the envelope for Mellin correction terms.

Properties of the Mellin transform are employed to modify the signal so that the error correcting is no longer required. The resulting algorithms are tested with variously scaled inputs for which closed form solutions are known. With a verified modification in place, the preprocessor produces features that are invariant to shifting and scaling, while retaining enough information to classify canonic shapes. A method of improving performance is introduced. Author (GRA)

N82-30439# Naval Postgraduate School, Monterey, Calif.
STIMULATED CERENKOV RADIATION PRODUCED BY 100 Mv ELECTRONS M.S. Thesis
Leslie John Brown Dec. 1981 55 p refs
(AD-A114469) Avail: NTIS HC A04/MF A01 CSCL 20/6

It is proposed that electromagnetic radiation of a specified frequency can be produced by stimulated Crenkov radiation in a dielectric resonator excited by a relativistic electron beam. The frequency generated depends upon the energy of the electrons and the refractive index and dimensions of the dielectric. This work describes the continuation of an experiment designed to verify the proposed radiation using 100 MeV electrons and a polyethylene slab. Problems encountered during the experiment are discussed and suggestions for continuing work are provided. Radiation is produced at several discrete frequencies, which are harmonics of the electron bunch frequency as produced by the LINAC. The absence of modes at the resonant frequency of the dielectric is understandable, considering the short length of the resonator. When the limitations imposed by the physical dimensions of the dielectric slab are considered, the results support the prediction. Author (GRA)

N82-30440# Naval Research Lab., Washington, D. C.
A COMPACT HF ANTENNA ARRAY USING REACTIVELY-TERMINATED PARASITIC ELEMENTS FOR PATTERN CONTROL Interm Report
R. J. Dinger and W. D. Meyers 11 May 1982 36 p refs
(RR0210542)
(AD-A114557; NRL-MR-4797) Avail: NTIS HC A03/MF A01 CSCL 09/5

Measurements have been made on two 7 element azimuthally-symmetric arrays, consisting of one active receiving element mounted at the center of six symmetrically positioned parasitic elements with variable reactive terminations. The measurements were made at frequencies between 15 and 25 MHz on an antenna range. Most of the data was taken on an array of diameter 80 cm (0.05 lambda at the center frequency of 18 MHz) with helically-wound monopole elements. Attempts were made to form the array pattern deterministically by using Harrington's theory to compute the reactive loads necessary to form a pattern lobe in a desired direction. Although the pattern lobe could be steered in the general desired direction, the directivity of the pattern was low and reproducibility poor. The majority of the measurements used the array in an adaptive mode in which the reactive terminations were adjusted manually to minimize one or two incident signals representing undesired interference. The manual adaptation consistently produced sharp spatial notches in the direction of the interference in an otherwise nearly omnidirectional pattern. The notches typically had a width of 50 degrees and depth of 25 to 30 dB below the pattern main lobe; the cancellation bandwidth was 40 kHz. Author (GRA)

N82-30441# Naval Research Lab., Washington, D. C. Radar Analysis Branch.
AUTOMATIC DETECTORS FOR FREQUENCY AGILE RADARS Interim Report
G. V. Trunk 23 Apr. 1982 16 p refs
(RR0210543)
(AD-A114673; NRL-8571) Avail: NTIS HC A02/MF A01 CSCL 17/9

When frequency agility is used in radars, the received sidelobe jamming power can vary by as much as 20 dB even though the transmitted jamming power is constant over the radar bandwidth. Various detectors were compared using simulation techniques; the best detector was the ratio detector, which normalizes the received power on every pulse with the surrounding reference cells and then sums these normalized power ratios. In the presence of short-pulse interference, a low false-alarm rate can be maintained by soft-limiting of the individual power ratios. GRA

N82-30442# Naval Research Lab., Washington, D. C. Target Characteristics Branch.
BROAD-BAND MIRROR-SCANNED SURVEILLANCE RADAR ANTENNA Final Report
B. L. Lewis, J. P. Shelton, E. E. Maine, N. V. ONeal, and C. L. Moody 29 Apr. 1982 28 p refs
(SF121491)
(AD-A114812; NRL-8574) Avail: NTIS HC A03/MF A01 CSCL 17/9

New applications and methods of broadbanding mirror scanned antennas to multioctave coverage are discussed. The applications include hemispheric coverage with pencil beams and continuous 360 deg. azimuth scan with vertical fan beams. In these applications, a twist reflector is the only moving part so that multiple stacked beams or multiple band multifunction beams can be easily instrumented. Author (GRA)

N82-30443# Naval Research Lab., Washington, D. C. Airborne Radar Branch.
SUPPRESSION OF SECOND TIME AROUND RADAR RETURNS USING PRI MODULATION Final Report
Karl Gerlach and G. A. Andrews 13 May 1982 16 p refs
(AD-A114985; NRL-8584) Avail: NTIS HC A02/MF A01 CSCL 17/9

It is shown that a modulated or staggered PRI radar system can offer considerable improvement over a nonstaggered radar system in rejecting second time around returns which cause false alarms. This improvement is a function of the number of staggered PRI, the quiescent false alarm number, the Swerling number of the false return, the transmitted signal power, the second time around noise power, and the quiescent noise power of the radar. Small changes in transmitted signal power can be traded-off with the quiescent false alarm number to significantly suppress the bogus return. In addition for all other parameters being equal, if the second time around return is a Swerling case II or IV target, then there is an optimum number of staggered PRI that can be chosen to minimize the likelihood of detection of the second time around return. GRA

N82-30444# Navy Fleet Material Support Office, Mechanicsburg, Pa. Operations Analysis Div.
INFRARED DATA COMMUNICATIONS
H. C. Fenstermacher, Jr. 5 May 1982 25 p refs
(AD-A114928; Rept-149) Avail: NTIS HC A02/MF A01 CSCL 17/2

This report provides an introduction to the technology of infrared data communications. The Navy is greatly increasing its use of distributed data processing techniques. Telephone lines are normally used to provide the required short range data communications between the host computer and remote terminals and other peripheral equipment. However, installation of additional telephone lines often involves delays, inconvenience and considerable expense. Infrared communications have proven to be an economical and reliable alternative technology for short range data communications requirements. Use of a single infrared communications unit at the Navy Fleet Material Support Office (FMSO) resulted in savings of approximately $90,000 during Fiscal Year 1980. Savings in subsequent years were similar, but not as large due to reduction in rate schedules. Author (GRA)

N82-30445# Naval Research Lab., Washington, D. C.
CHARACTERISTICS OF AN ATMOSPHERIC DISCHARGE PLASMA AS AN RF ANTENNA Interim Report
J. R. Greig, R. E. Pechacek, M. Raleigh, T. Dwyer, and D. P. Murphy 27 May 1982 22 p
(R0110941)
(AD-A115362; NRL-MR-4815) Avail: NTIS HC A02/MF A01 CSCL 09/5

The plasma produced by a laser-guided, electric discharge in the atmosphere has been formed in the shape of a folded monopole antenna with a characteristic frequency of 112 MHz. This plasma antenna has been used to transmit and receive signals at 112 MHz. While the plasma conductivity remained above a certain value, the signal transmitted from, and received on, the plasma antenna was within + or - 1 dB of that

transmitted from and received on a 'standard' copper folded monopole antenna of the same size. During this time the signal transmitted from, and received on, the plasma antenna also remained approximately constant in amplitude (fluctuations about + or - 1 dB). This useful lifetime of the plasma antenna was varied from about 200 microsecs to about > 2000 microsecs by changing the duration of the electric discharge sustaining the plasma columns. In these experiments, the noise from the plasma antenna was not distinguishable from that developed using a copper antenna, but in both cases the noise was much larger than the true thermal noise background. GRA

N82-30446# Harris Corp., Melbourne, Fla. Government Communication Systems Div.
HF MODEM FEASIBILITY DEMONSTRATION Final Technical Report, Mar. - Oct. 1981
Daniel D. McRae, Ronald S. LeFever, and Joseph N. York Griffiss AFB, N.Y. RADC Mar. 1982 113 p refs
(Contract F30602-81-C-0093; AF Proj. 4519)
(AD-A115433; RADC-TR-28-48) Avail: NTIS HC A06/MF A01 CSCL 17/2

The objective of this program was to evaluate a recently developed, bandwidth efficient, channel-adaptive digital modem for radio communications below 30 MHz (High Frequency (HF)). The block and bit error performance during simplex operation was characterized over both Harris Corporation and RADC's HF simulators. Performance for 2.4, 3.6, and 4.8 kb/s in a 3 kHz channel was obtained on both HF simulators while performance at 8 and 16 kbps in a 6 kHz channel was obtained only on Harris HF simulator. Author (GRA)

N82-30447# Mitre Corp., Bedford, Mass.
USE OF TIME DOMAIN REFLECTOMETRY FOR EMP HARDNESS SURVEILLANCE
J. R. vanZandt Apr. 1982 26 p refs
(Contract F19628-82-C-0001; AF Proj. 4810)
(AD-A115032; MTR-8535; ESD-TR-82-121) Avail: NTIS HC A03/MF A01 CSCL 20/14

A laboratory demonstration of the feasibility of using a time domain reflectometer (TDR) to detect failures of electromagnetic pulse (EMP) hardening capacitors is described. The TDR enables a technician to easily detect an open circuit failure in a capacitor if measurements can be made near the capacitor. Measurements can also be made at a distance if previous measurements of a known good installation are available for comparison. The Tektronix 1502 TDR cable tester was found to be particularly well suited to making these measurements. GRA

N82-30448# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Oceanography Div.
DUAL FREQUENCY RADAR ICE AND SNOW SIGNATURES
R. D. Ketchum, Jr. Dec. 1981 26 p refs
(AD-A115297; NORDA-TN-135) Avail: NTIS HC A03/MF A01 CSCL 17/9

Dual frequency (X-band and L-band) synthetic aperture radar imagery of sea ice is examined to show the differences between the bands and their complementary nature for resolving ambiguities in interpretation. High backscatter at X-band from visibly smooth thin ice is not observed at L-band. The hypothesis is that the high X-band backscatter is caused by a reflective layer at the snow/ice interface. A second hypothesis is that the high X-band backscatter may be caused by moisture in the snow. High backscatter at L-band is observed for slush on open water. The return is very weak at X-band, thus allowing distinction of sluch by comparing L-band and X-band images. High intensity, but only partial returns from icebergs at L-band have been observed. The hypothesis is that internal iceberg/sea water reflections are occurring. Some signals are directed away from the antenna; other reinforced signals are returned, producing very bright images. Occasionally, the time-delayed signals are returned causing a false image at far range from the iceberg. The conclusion is that L-band is a poor choice for studies of iceberg distribution and size, but a good choice for studies of iceberg detection because of the high reinforced returns from many icebergs and the low return from the adjacent sea ice. The penetration and subsequent signal loss of L-band in glacial ice, when compared to high X-band returns, may be useful to map glaciated land masses. Author (GRA)

N82-30449# Transportation Systems Center, Cambridge, Mass.
SUCCESSFUL APPLICATION OF LOW LOSS, OVER-MODED WR-187 WAVEGUIDE TO THE ASDE-3 RADAR Final Report, Apr. 1979 - Apr. 1980
Philip J. Pantano Apr. 1982 16 p refs
(AD-A115465; DOT-TSC-FAA-81-17; DOT-FAA-RD-81-89)
Avail: NTIS HC A02/MF A01 CSCL 17/9

Overmoded WR-187 waveguide has been incorporated into the short-range ASDE-3 system to provide a low-loss interconnection between the antenna and the transmitter/receiver. WR-62 to WR-187 transitions and WR-187 mode suppressors were developed specifically for this short-range radar application to provide low loss transmission of 0.01 dB per ft. The 36-nanosecond, 160-dB dynamic range ASDE-3 system is operating without resonance effects down to the required minimum radar range of 500 ft. This report presents pertinent technical detail and briefly describes the testing process. Author (GRA)

N82-30450# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SIMULATION AND ANALYSIS OF THE AFLC BULK DATA NETWORK USING ABSTRACT DATA TYPES M.S. Thesis
Stephen D. Stewart Dec. 1981 168 p refs
(AD-A115552; AFIT/GCS/EE/81D-15) Avail: NTIS HC A08/MF A01 CSCL 09/2

The AFLC Bulk Data Network (BDN) is a packet switching network which electronically transfers bulk computer data (magnetic tapes) between the six AFLC bases. The network operates at 'full' capacity for extended periods of time at the beginning of each month. This results in undesirable delays in transferring data between the sites. To remedy the problem, AFCCPC//SKDAR plans to add an additional circuit to the network and increase the transmission capacity of another circuit. A computer simulation was developed and validated to analyze this and other proposals formulated to improve network performance. The simulation makes extensive use of abstract data types to represent key network components. The abstract data structures provide a set of functional building blocks which are linked together to model a variety of network configurations. The program incorporates full node to node link and tape to tape message protocols. The model can be used to study both interactive and batch traffic, using one of three different routing algorithms. Author (GRA)

N82-30451# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
TIME AXIS ANALYSIS OF GRAVITY DISTORTED SPEECH M.S. Thesis
J. Calvin Hunter Dec. 1981 229 p refs
(AD-A115540; AFIT/GE/EE/81D-27) Avail: NTIS HC A11/MF A01 CSCL 17/2

An algorithm to determine energy shift along the time axis was applied to digitized speech data, which had been recorded at six different gravity levels. The analog speech was recorded during the centrifuge tests at the Air Force Medical Research Lab, Wright-Patterson AFB, Ohio. The data was then digitized, Fourier Transformed, high frequency preemphasized, channel compressed, and energy-normalized. The processed files were checked for time duration of each word in both the time and frequency domain. Large time-duration differences--up to 200 msecs--were recorded; but there was no statistical mapping pattern of distortion versus gravity level. Time distortion of the speech energy within a given gravity level was as significant as the distortion between gravity levels. The results indicate that no additional time warping considerations will need to be made within the speech recognition algorithms to compensate for gravity fluctuations. Author (GRA)

N82-30452# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
NOISE CANCELLATION TO IMPROVE THE QUALITY OF LPC PROCESSED SPEECH DEGRADED BY NOISE M.S. Thesis
Christopher L. Batchelor Dec. 1981 76 p refs
(AD-A115539; AFIT/GE/EE/81D-10) Avail: NTIS

HC A05/MF A01 CSCL 17/2

Methods for improving the quality of the speech resulting from linear predictive analysis/synthesis of speech degraded by background noise are discussed. A method of noise cancellation using Wiener filtering in the frequency domain with the short-time Fourier transform was chosen for implementation. Implementation was done on a Data General Nova/Eclipse digital signal processing system in FORTRAN 5. Speech degraded by white gaussian noise was processed through linear predictive analysis/synthesis with and without noise cancellation preprocessing. Preliminary laboratory listenings verified that an improvement in quality was achieved with noise cancellation preprocessing. Although improvement in quality was achieved, more effort is required to make this implementation more efficient and improve the quality of speech produced. Author (GRA)

N82-30453# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

FREE SPACE ANALYSIS OF THE SCATTERED ELECTROMAGNETIC FIELDS AS A DIPOLE APPROACHES A LEAKY COAXIAL CABLE M.S. Thesis

Daryl L. Tomczyk Dec. 1981 59 p refs

(AD-A115535; AFIT/GE/EE/81D-60) Avail: NTIS HC A04/MF A01 CSCL 20/3

The free space interaction of the near zone electromagnetic fields external to a leaky coaxial cable and a moving dipole is investigated. The method of moments and the equivalence principle are used to find the currents on the dipole and the electromagnetic fields scattered from the dipole. Finally, the overall interaction between these two fields is determined by superposition. The theoretically derived results are then compared with experimental measurements. The findings of this report indicate that exact results are not obtained with a free space analysis; therefore, further work involving electronic intruder detection analysis should include the effects of the earth-air interface. Author (GRA)

N82-30454# Rice Univ., Houston, Tex. Dept. of Electrical Engineering.

DATA LATENCY IN TIME MULTIPLEXED BUS SYSTEMS FOR MISSILE APPLICATIONS Final Report, 1 Jan. 1981 - 22 Feb. 1982

J. B. Sinclair 11 Mar. 1982 26 p refs

(Grant AF-AFOSR-0178-81; AF Proj. 2305)

(AD-A115133; AFOSR-82-0415TR) Avail: NTIS HC A03/MF A01 CSCL 17/2

This research examines the performances of three computer communication bus protocols: round robin passing protocol (RRPP), modified round robin passing protocol (MRRPP), and carrier-sense multiple-access with collision detection (CSMA/CD). These are compared through the simulation of a medium-range air-to-surface guided weapon federated computer network, specifically the mid-course guidance phase. The performance of each protocol is measured by the average and maximum message waiting time and latency. Under these performance measures, the CSMA/CD protocol is clearly superior, with average message waiting time as low as 22% of that for RRPP and 8% of that for MRRPP. Maximum waiting times are also lower for CSMA/CD, although by a much narrower margin. This indicates the potential for the use of CSMA/CD communication channels in low channel utilization, delay-sensitive applications.

Author (GRA)

N82-30455# Mitre Corp., Bedford, Mass.

FREQUENCY DEPENDENCE OF APATS ANTENNA GAIN

G. A. Robertshaw Hanscom AFB, Mass. Electronic Systems Div. Mar. 1982 53 p ref

(Contract F19628-81-C-0001; AF Proj. 4290)

(AD-A115059; MTR-8354; ESD-TR-82-120) Avail: NTIS HC A04/MF A01 CSCL 09/5

If the APATS receiving array antenna is electronically steered by standard phase shifters at each element, the optimum gain for a signal arriving from a particular direction is dependent upon the frequency of the source. The APATS system requires simultaneous reception of two frequencies per re-entry vehicle, and optimum reception requires two sets of phase shifters per RV per polarization. This report examines the degradation of the array gain when one set of phase shifters is used for dual frequency reception. The gain of the array at the second, non-optimal frequency is dependent upon frequency separation, array size and illumination, and the direction cosines of the incident propagation vector with respect to the array axes. An array phase steering method which minimizes gain loss to one dB or less for typical cases is suggested. Author (GRA)

N82-30456# Naval Research Lab., Washington, D. C. Radar Techniques Branch.

ESTIMATION OF THE SEA SURFACE RADAR CROSS SECTION AT HF FROM SECOND ORDER DOPPLER SPECTRUM CHARACTERISTICS Interim Report

D. B. Trizna 25 May 1982 25 p refs

(RR0210543)

(AD-A115230; NRL-8579) Avail: NTIS HC A02/MF A01 CSCL 17/9

A technique is developed for estimating the radar cross section of the sea surface at HF (2-30 MHz) from two simple measurements made of the radar Doppler spectrum. These are: the ratio of approach/recede Bragg line energy, and the ratio of strongest Bragg line amplitude to average value amplitude of second-order backscatter at zero Doppler frequency. A nomograph is given, based on a theoretical model of second-order scatter developed by the author, which then allows one to determine the number of decibels the Bragg ocean spectral component is down from the classical Phillips asymptotic value, used here only for a reference. Comparison is made with some surface wave data for three different cases in which buoy data are available for comparison with multi-frequency radar data collected simultaneously at two different look angles. An example is also shown where such a calculation can be used to estimate the cross section of a target return existing within the same Doppler spectrum. Limitations of the technique are also discussed.

Author (GRA)

N82-30457# Rome Air Development Center, Griffiss AFB, N.Y. Propagation Branch.

MEASUREMENT OF SEA AND ICE BACKSCATTER REFLECTIVITY USING AN OTH RADAR SYSTEM

William F. Ring and Gary S. Sales Mar. 1982 18 p refs

(AF Proj. 2305)

(AD-A115225; RADC-TR-82-63) Avail: NTIS HC A02/MF A01 CSCL 17/9

It is essential, during the operation of an OTH-radar system designed for the detection of small targets (aircraft or cruise missiles), that the operators be able to estimate the system sensitivity in real time without targets present. In geographical areas under surveillance that are remote and inaccessible, this technique involves measuring the ratio of the signal returned from the 'ground' to the noise signal. Data from Polar Fox II experimental OTH-radar system was analyzed in order to determine the intrinsic backscatter reflectivity from open ocean, sea ice, and the Greenland ice cap. Author (GRA)

N82-30458# Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.

THE UTILITY OF SAR TO MONITOR OCEAN PROCESSES Final Report, Jan. 1980 - Sep. 1981

R. A. Shuchman, E. S. Kasischke, G. A. Meadows, J. D. Lyden, D. R. Lyzenga, P. L. Jackson, A. L. Maffett, and A. Klooster, Jr. Nov. 1981 405 p refs

(Contract N00014-76-C-1048; NR Proj. 387-132)

(AD-A115188; ERIM-124300-11-F) Avail: NTIS HC A18/MF A01

This report investigates the utility of using synthetic aperture radar (SAR) to monitor the Earth's oceans. The report consists of three parts which include: (1) a review on the present capability of SARs to monitor ocean processes, (2) a status report on the processing and preliminary analysis of UPD-4 and UPD-6 data collected during the MARSEN'79 Experiment, and (3) a collection of journal articles and symposia papers which resulted from this ONR-funded ERIM research. The review of the present status of SAR's utility to monitor the oceans includes the detection and measurement of gravity waves, currents, long-period waves, internal waves, frontal boundaries, bottom topographic features, surface winds, surf zone conditions, oil slicks, and sea ice. Results of this analysis indicate the UPD-4 X-band SAR imagery is not significantly improved, with regard to visibility of waves on the

imagery when motion compensation adjustments are incorporated into the processing of the SAR signal histories. Selected passes of UPD-4 and UPD-6 X-band imagery have been digitized and comparisons between SAR generated wave spectra and surface measured spectra were made. GRA

N82-30459# Mission Research Corp., Albuquerque, N. Mex.
OPTIMAL APPLICATION OF MULTILAYER SHIELDING FOR MAXIMAL EM FIELD ATTENUATION Final Report
F. C. Yang and K. S. H. Lee Kirtland AFB, N. Mex. AFWL Apr. 1982 114 p refs
(Contract F29601-78-C-0082; AF Proj. 3763)
(AD-A115187; AFWL-TR-81-127) Avail: NTIS HC A06/MF A01 CSCL 20/3

A two-surface cable shield periodic bondings and with either discrete or distributed excitation is analyzed. It is found that the bondings improve the overall shielding effectiveness of the cable shield at certain frequencies, but degrade the shielding at others. Certain criteria are established for better shielding. In the case of distributed excitation, the overall effective transfer functions of a two-surface cable shield can be calculated from simple circuits. These circuits can be extended for multisurface cable shields. Part II extends the previous work on a single-surface shielded enclosure of arbitrary shape to a multisurface enclosure with or without electrical bonding between the shields. It is found that the inductive mutual interactions among the shields and the bonding straps reduce the effectiveness of a multisurface shielded enclosure against the penetration of external magnetic fields. Author (GRA)

N82-30460# Maryland Univ., College Park. Dept. of Mathematics and Statistics.
NONEXISTENCE OF SMOOTH ELECTROMAGNETIC FIELDS IN NONLINEAR DIELECTRICS. 2: SHOCK DEVELOPMENT IN A HALF-SPACE
Frederick Bloom Mar. 1982 30 p refs
(Grant AF-AFOSR-0171-81; AF Proj. 2304)
(AD-A115348; MD82-12-FB; AFOSR-82-0461TR; TR82-9)
Avail: NTIS HC A02/MF A01 CSCL 20/3

If over the distance travelled by the beam into the half-space, until shock development, max epsilon approximately max epsilon 0 then we have the (admittedly crude but, nonetheless, informative) estimate (3.8) S max equal C0 max epsilon 0) the minus 3/2 (max/epsilon prime 0/)3 over 2 to the minus 1 where Co = one over the square root of 2 micron one half power(0) over chi to the 3 power(1) is a characteristic material coefficient which may be associated with a particular nonlinear dielectric substance. For most common nonlinear dielectric substance, e.g., index matched KDP, C0 will be a very large number, something of the order of magnitude 10 to the 21th power. This (3.8) indicates that even for an incident high intensity beam of the order of magnitude of 10 to the 9th power volts/meter a steep gradient on the incident beam will be needed so that shock development may occur within distances obtainable under laboratory conditions. GRA

N82-30461# Northeastern Univ., Boston, Mass.
RECEIVER OPTIMIZATION AND ERROR RATES FOR PSEUDO-NOISE SPREAD SPECTRUM SYSTEMS WITH NARROWBAND INTERFERENCE SUPPRESSION Final Technical Report
John W. Ketchum and John G. Proakis Griffiss AFB, N.Y. RADC Feb. 1982 123 p refs
(Contract F30602-78-C-0102; AF Proj. 2305)
(AD-A115007; RADC-TR-81-402) Avail: NTIS HC A06/MF A01 CSCL 12/1

This report describes the results of a study of maximum likelihood receiver structures for direct sequence spread spectrum communications over channels with multipath distortion and narrowband interference, and several methods of assessing the bit error probability performance of bit-by-bit receivers and maximum likelihood receivers. This work is a continuation of work which focused on the performance of various methods of suppressing narrowband interference using spectral estimation. The previous work gave performance results in terms of SNR improvement provided by interference suppression. The previous results are extended in this report by deriving a receiver structure based on the maximum likelihood (minimum probability of error) principle. Error probability results given include simulation of a bit-by-bit receiver operated in conjunction with dispersive and nondispersive channels with narrowband interference. Also, a technique for assessing the error rate by averaging conditional probabilities is stated which applies to both fixed nondispersive and fixed dispersive channels, and bit-by-bit and maximum likelihood receivers. Probability of error results obtained using this approach are given. Author (GRA)

N82-30462# Ohio State Univ., Columbus. ElectroScience Lab.
NEAR FIELD ANALYSIS OF AIRBORNE ANTENNAS Final Report
W. D. Burnside and N. Wang Dec. 1981 33 p refs
(Contract N00019-80-C-0593)
(AD-A115074; ESL-713321-4) Avail: NTIS HC A03/MF A01 CSCL 09/5

The radiation pattern analysis of the prolate spheroid based on the efficient UTD and geodesic solutions developed at least partially under previous NASC contracts has been combined with the flat plate scattering analysis in order to simulate complex airborne structures. This includes the junction edge scattering which results at the union between the fuselage (prolate spheroid) and flat plate. This solution is being verified by comparisons with various airborne antenna configurations. In addition, the geodesics for an ellipsoid have been found using a perturbation theory similar to that used for the prolate spheroid. This new ellipsoid configuration will be used to represent the fuselage in future simulation analyses. Author (GRA)

N82-30463# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Electrical Engineering.
THE EFFECT OF RADOME SCATTERING ON ECM ANTENNA PATTERNS M.S. Thesis
Robert K. Schneider Dec. 1981 150 p refs
(AD-A115517; AFIT/GE/EE/81D-52) Avail: NTIS HC A07/MF A01 CSCL 17/9

The problem of scattering by thin cylindrical dielectric shells of large circular cross sections is approached by two methods: (1) an infinite series of eigenfunctions, and (2) the method of moments. Numerical results are presented for shell radii of 0.3 lambda, 3.0 lambda, and 30 lambda, the source being an electric line current near but external to the shell. Computer programs are presented which implement these two solutions. When the scattering structure does become large limitations on numerical results are encountered due to computer memory and speed limitations. Author (GRA)

N82-30464# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Electrical Engineering.
THE CORRELATION BETWEEN SUBJECTIVE AND OBJECTIVE MEASURES OF CODED SPEECH QUALITY AND INTELLIGIBILITY FOLLOWING NOISE CORRUPTION M.S. Thesis
Jeffrey A. Kayser Dec. 1981 70 p refs
(AD-A115515; AFIT/GE/EE/81D-30) Avail: NTIS HC A04/MF A01 CSCL 17/2

A scoring metric of speech intelligibility based on linear predictive coding (LPC) was developed and evaluated. The data base used for evaluating the metric consisted of a list of 50 words from the Modified Rhyme Test. The list was transmitted over a LPC-10 Vocoder with no background noise. The list was scored subjectively for intelligibility by a trained listener panel. The subjective scores were used to judge the effectiveness of the objective metric. The LPC scoring metric was calculated for the list of words and compared to the subjective scoring. The intelligibility score for the objective scoring metric was 82.99% with a standard deviation of 14.41%. The score for the subjective listener testing was 84.91% with a standard deviation of 7.47%. This shows a possible correlation between the objective LPC scoring metric and standard subjective listener scoring methods. GRA

N82-30465# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNAS
13 May 1982 177 p refs Transl. into ENGLISH from Antenny (USSR), no. 1, 1966 p 1-152

(AD-A115394; FTD-ID(RS)T-1170-81) Avail: NTIS HC A09/MF A01 CSCL 09/5

Articles on the following topics are presented: problems in the design and methods of calculating the parameters of very low frequency and low frequency antennas, quasi-optical transmission lines for millimeter waves, the design of antenna arrays, the theory of mixed problems in antenna design and synthesis, the investigation of binary sources of radio frequency radiation using an interferometer, a method for solving exterior problems in electrodynamics, optimal differential electric field distributions in an antenna aperture, calculating the characteristics of a junction of two waveguides for a round waveguide with an azimuthally magnetized ferrite rod, a spiral line with an azimuthally magnetized ferrite cylinder, and calculation of a y circulator waveguide with a ferrite dielectric element. J.D.

N82-30466# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).

FEASIBILITY INVESTIGATIONS INTO A FIELD PULSE GENERATOR FOR SIMULATOR STUDIES [REALISIERBARKEITS-UNTERSUCHUNGEN FUER EINEN FELDSPRUNGGENERATOR FUER MODELLVERSUCHE]

F. Hutt Bonn Bundesministerium der Verteidigung 1980 59 p refs In GERMAN Sponsored by Bundesministerium der Verteidigung

(BMVg-FBWT-80-16) Avail: NTIS HC A04/MF A01; DOK-ZENTBw, Bonn DM 30

Difficulties in measuring the influence of nuclear electromagnetic pulses (NEMP) on spaceborne equipment and systems were studied and the possibilities and limits of a simulator test were investigated. Theoretical fundamentals of simulating fast electromagnetic pulses are reviewed. Model scaling relationships are derived with which measured magnitudes can be used to get a good prediction of reality. Mathematical laws, concerning NEMP, are given and requirements for a field pulse generator in an electromagnetic pulse simulator are outlined. Applicability of impulse measurement or spectral analysis through model measurement are considered. Problems with reference to field construction both by transmission lines and broadband dipole techniques are revealed. Author (ESA)

N82-30467# Research Inst. of National Defence, Linkoeping (Sweden).

WAVE FRONT BEHAVIOR BEHIND A LINE OF TREES AT A FREQUENCY OF 139 MHz

Stellan Nilsson Mar. 1982 42 p refs In SWEDISH; ENGLISH summary

(FOA-C-30266-E1) Avail: NTIS HC A03/MF A01

Measurements of signal strength and phase were carried out at two different locations; the signal emitter was 2 km in front of the woods and the receiver, mounted on a truck equipped with a 10 m high antenna, moved to the other side. A computer simulation with high resolution was performed, showing the wave front behavior at strong fading. Diagrams from 14 measurement squares of size 20 m X 20 m with wavefront and signal strength as well as signal strength distributions for different distances from the woods are presented. Author (ESA)

N82-30468# Christian Rovsing Ltd., Copenhagen (Denmark).

SAR OPERATIONAL ASPECTS Final Report

P. E. Holmdahl, A. B. E. Ellis (Marconi Co., Ltd., Chelmsford, England), P. Moeller-Olsen, and J. P. Ringgaard Paris ESA Dec. 1981 239 p

(Contract ESA-4497/80/NL-PP(SC))

(ESA-CR(P)-1554) Avail: NTIS HC A11/MF A01

The basic requirements of the SAR ground segment of ERS-1 are discussed. A system configuration for the real time data acquisition station and the processing and archive facility is depicted. The functions of a typical SAR processing unit (SPU) are specified, and inputs required for near real time and full precision, deferred time processing are described. Inputs and the processing required for provision of these inputs to the SPU are dealt with. Data flow through the systems, and normal and nonnormal operational sequence, are outlined. Prerequisites for maintaining overall performance are identified, emphasizing quality control. The most demanding tasks to be performed by the front end are defined in order to determine types of processors and peripherals which comply with throughput requirements. Author (ESA)

N82-30469# Spar Aerospace Ltd., Ste-Anne-de-Bellevue (Quebec).

STUDY ON HIGHLY SHAPED BEAM ANTENNAS FOR LOW ORBITING SATELLITE, VOLUME 1 Final Report

Paris ESA Aug. 1981 352 p refs 2 Vol.

(Contract ESTEC-4451/80/NL-PP(SC))

(RML-009-81-09-Vol-1; ESA-CR(P)-1557-Vol-1) Avail: NTIS HC A16/MF A01

Computer software was developed for the analysis and synthesis of antennas with shaped reflector profiles. Alternative antenna configurations in the context of an LOSB application were studied, and the effects of alternative parameter values for the chosen configuration were investigated. An analytical simulation of the effects of scattering off the body of the spacecraft is presented. The optimization processes leading to the final breadboard antenna design is described. S.L.

N82-30470# Spar Aerospace Ltd., Ste-Anne-de-Bellevue (Quebec).

STUDY ON HIGHLY SHAPED BEAM ANTENNAS FOR LOW ORBITING SATELLITE. VOLUME 2: EXECUTIVE SUMMARY

Paris ESA Aug. 1981 51 p refs 2 Vol.

(Contract ESTEC-4451/80/NL-PP(SC))

(ESA-CR(P)-1557-Vol-2) Avail: NTIS HC A04/MF A01

The design and development of an antenna generating a highly shaped beam suitable for providing Earth coverage from a low orbiting satellite are summarized. A software package was evolved for the analysis and synthesis of shaped beam antennas. Alternative antenna configurations were studied. The effect of scattering from the satellite body was investigated analytically. A breadboard antenna which takes into account the effect of secondary scattering from the feed and support struts was designed. Tests on a feed horn and the assembled breadboard antenna included the installation of a simple model of the satellite body on the range in order to provide data for comparison with the analytical predictions. Author (ESA)

N82-30471# EMI-Varian Ltd., Hayes (England).

A PRELIMINARY DESIGN STUDY FOR A HIGH POWER, PULSED, MICROWAVE AMPLIFIER: SAR APPLICATIONS

S. Feltham Paris ESA Sep. 1981 162 p refs

(Contract ESA-4007/79/NL-PP(SC))

(EVT-707; ESA-CR(P)-1558) Avail: NTIS HC A08/MF A01

A klystron amplifier which uses a nonoptimized gun and a water cooled single stage depressed collector was designed for spaceborne applications. Computer analysis and cold test measurements demonstrate gain, bandwidth, efficiency mean power, and duty and peak power characteristics which either match or exceed design specifications. Experimental results show peak output power of 6.05 kW, at 46.7% efficiency, a bandwidth of 45 MHz and a mean output power of 390 W. Equipment failures prevented the tube from being tested at the full specified duty (10 kW peak, 600 W mean) although a 10 kW peak output was obtained just before failure. Author (ESA)

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-30472*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

ENERGY SAVING ELECTRICAL MOTOR CONTROL SYSTEM Patent Application

Teddy M. Edge, inventor (to NASA) Filed 23 Jul. 1982 13 p

(NASA-Case-MFS-25560-1; US-Patent-Appl-SN-401283) Avail: NTIS HC A02/MF A01 CSCL 09A

An energy saving system in ac electrical motors which provides optimum control of the triac control voltage supplied to different motors with which the system is used, despite the different characteristics of such motors is described. A three phase motor, including a triac control circuit for each phase is shown. Triggering of triac is controlled by the light output of LED received by photocell resistance. Zener diode controls charging of timing capacitor for the triac regardless of the motor back EMF. The physical arrangement of LED and individual photocells are shown. An alternative embodiment using constant current diodes to provide constant current charging of timing capacitor independently of motor back EMF is used. NASA

N82-30473*# National Aeronautics and Space Administration, Washington, D. C.

DEVELOPMENT WORKS ON NICKEL/HYDROGEN CELLS

G. Gutmann Jun. 1982 20 p refs Transl. into ENGLISH of paper presented at the Appl. Electrochem. Energy Conversion Including Storage; sponsored by the German Chemical Society and at the Seminar on Electrochem. Energy Technol.; sponsored by the Bundesministerium fuer Forschung und Technologie (West Germany), 1981 p 1-17 Confs. held in Ludwigshfen, West Germany, 30 Sep. - 2 Oct. 1981

(Contract NASw-3542)

(NASA-TM-76922; NAS 1.15:76922) Avail: NTIS HC A02/MF A01 CSCL 10C

Experiments were performed to reduce the costs for NI/H2 cells by using nickel oxide electrodes with high capacity per unit area. No maintenance requirements, long cycle life, insensitivity to overcharge and cell reversal, and high power capability were revealed. S.L.

N82-30474*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

COMPONENT TECHNOLOGY FOR SPACE POWER SYSTEMS

Robert C. Finke 1982 13 p refs Presented at the 33rd Intern. Astronautical Federation Congr., Paris, 26 Sep. - 2 Oct. 1982

(NASA-TM-82928; E-1322; NAS 1.15:82928) Avail: NTIS HC A02/MF A01 CSCL 09C

The Lewis/OAST program for the development of Component Technology for Space Power Systems is described. The program is divided into five generic areas: semiconductor devices (transistors, thyristors, and diodes); conductors (materials and transmission lines); dielectrics; magnetic devices; and thermal control devices. Examples of progress in each of the five areas is discussed. Bipolar power transistors up to 1000 V at 100 A with a gain of 10 and a 0.5 mu sec rise and fall time are presented. A new class of semiconductor devices with a possibility of switching 1000 000 V is described. Several 100 kW rotary power transformer designs and a 25 kW, 20 kHz transformer weighting 3.2 kg have been developed. Progress on the creation of diamond-like films for thermal devices and intercalated carbon fibers with the strength of steel and the conductivity of copper at one third the mass of copper is presented. Author

N82-30475# Naval Air Development Center, Warminster, Pa. Sensors and Avionics Technology Directorate.

AN IMPROVED ELECTRO-OPTICAL IMAGE QUALITY SUMMARY MEASURE

Alan H. Blumenthal and Stephen B. Campana 1 Oct. 1981 17 p refs Presented at the 25th Ann. Intern. Tech. Symp. of SPIE, San Diego, Calif., 24-28 Aug. 1981

(AD-A111739; NADC-81283-30) Avail: NTIS HC A02/MF A01 CSCL 09/1

The operational performance of electro-optical imaging systems is currently predicted using models based on an approach introduced by Johnson in 1958. This model has been shown to be inadequate when used to predict performance over a wide range of conditions of signal-to-noise ratio and range to the target. This paper describes our efforts to develop and validate a model which is more effective than the Johnson model in predicting image quality. Implications in performance prediction modeling and electro-optic sensor design tradeoffs between sensitivity and resolution are also discussed. Author (GRA)

N82-30476# Puerto Rico Univ., Rio Piedras. Dept. of Physics.

THE INTERFACIAL STRUCTURE OF A MIXTURE OF CHARGED HARD SPHERES AND DIPOLAR HARD SPHERES NEAR A CHARGED WALL

D. Henderson (IBM Research Lab., San Jose, Calif.) and L. Blum 20 May 1982 34 p refs Submitted for publication

(Contract N00014-81-C-0776; NR Proj. 051-775)

(AD-A114872) Avail: NTIS HC A03/MF A01 CSCL 09/1

In the past few years, there has been a renewed interest in the structure of an electrolyte at an electrode interface (the so-called electric double layer). If only the ions are taken onto account explicitly, with the solvent represented by a uniform dielectric medium of constant dielectric constant epsilon, the potential difference across the double layer is much smaller than is observed experimentally. This remains true even if the Poisson-Boltzmann theory of Gouy and Chapman (GC) is replaced by more refined theories, such as the hypernetted chain approzimation. Presumably, this error is due to the simplified treatment of the solvent. If it is assumed that the dielectric constant epsilon in the so-called inner region between the hard, flat, charged wall (the electrode) and a plane passing through the centers of the charged hard spheres in contact with the wall is different from the bulk value epsilon, the potential drop across the interface is where sigma is the diameter of the charged hard spheres sigma/2 is then the distance of closest approach to the wall), -E/4pi, is the charge density on the wall, and phi is the potential difference between the plane of sigma/2 and infinity. GRA

N82-30477# Draper (Charles Stark) Lab., Inc., Cambridge, Mass. Component Development Dept.

MATERIALS RESEARCH FOR ADVANCED INERTIAL INSTRUMENTATION; TASK 3: RARE EARTH MAGNETIC MATERIAL TECHNOLOGY AS RELATED TO GYRO TORQUERS AND MOTORS Progress Research Report, 1 Oct. 1980 - 30 Sep. 1981

D. Das, K. Kumar, and E. Wettstein Dec. 1981 70 p refs

(Contract N00014-77-C-0388)

(AD-A114955; CSDL-R-1529; TR-4) Avail: NTIS HC A04/MF A01 CSCL 09/1

Preliminary measurements of flux decay rates of high coercivity and high energy product hot isostatically pressed (HIPed) SmCo5 magnets show that an increase of samarium content by one weight percent, increasing the Sm2Co7 second phase, raises the decay rate from minus 43 ppm/decade to minus 1070 ppm/decade. This finding may prove to be extremely valuable for producing high stability SmCo5 magnets. Oxygen contamination, determined to be the other major cause of instability, is expected to be significantly lowered with the use of the facilities being developed for fabrication of oxygen free SmCo5 magnets with the support of a related program. GRA

N82-30478# Pennsylvania State Univ., University Park. Applied Research Lab.

THE PREDICTION OF TRANSDUCER ELEMENT PERFORMANCE FROM IN AIR MEASUREMENTS M.S. Thesis

Mark Evan Schafer 19 Jan. 1982 109 p refs

(Contract N00024-79-C-6043)

(AD-A114816; ARL/PSU/TM-82-62) Avail: NTIS HC A06/MF A01 CSCL 09/1

A technique has been developed which accurately predicts the performance of underwater acoustic arrays prior to array construction. The technique is based upon the measurement of lumped-parameter equivalent circuit values for each element in the array, and is accurate in predicting the array transmit, receive and beam pattern response. The measurement procedure determines the shunt electrical and motional circuit elements from electrical imittance measurements. The electromechanical transformation ratio is derived from in-air measurements of the radiating face velocity and the input current to the transducer at resonance. The equivalent circuit values of a group of Tonpilz-type transducers were measured, and the self and mutual interaction acoustic loadings for a specific array geometry were calculated. The response of the elements was then predicted for water-loaded array conditions. Based on the predictions, a selection scheme was developed which minimized the effects of inter-element variability on array performance. The measured

transmitting, receiving and beam pattern characteristics of a test array, built using the selected elements, were compared to predictions made before the array was built. The results indicated that the technique is accurate over a wide frequency range.
Author (GRA)

N82-30479# RCA Labs., Princeton, N. J.
MONOLITHIC GaAs DUAL-GATE FET PHASE SHIFTER Triannual Report, 1 Sep. - 31 Dec. 1981
M. Kumar, S. N. Subbarao, and J. C. Whartenby Feb. 1982 23 p refs
(Contract N00014-79-C-0568; RF62581001)
(AD-A114553; RCA-PRRL-82-CR-5) Avail: NTIS HC A02/MF A01 CSCL 09/5

The processing of the monolithic dual gate FET phase shifter has been completed, and the RF testing is in progress. The new design of the 360 deg phase shifter has been conceived requiring fewer hybrids. The mask design is in progress. GRA

N82-30480# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Information Transmission Branch.
ONE KILOWATT UHF SOLID STATE POWER AMPLIFIER Final Report, Sep. 1978 - Feb. 1981
Wayne Fischbach Feb. 1982 81 p
(AF Proj. 1227)
(AD-A115005; AFWAL-TR-81-1152) Avail: NTIS HC A05/MF A01 CSCL 09/5

The One-Kilowatt UHF Solid State Amplifier System (AN/ASC-31) is a state of the art airborne amplifier containing a fast tuning filter. This system interfaced with an AN/ARC-171 and modem generates a 1KW clean signal capable of fast hopping across the 225-400 MHz UHF frequency band. This report contains a description of the system and test results. The various tests accomplished with the system and described in this report are power input versus power output, intermodulation products measurement, thermal, and satellite tests. Author (GRA)

N82-30481# JAYCOR, Alexandria, Va.
INVESTIGATIONS OF CAVITY DESIGNS FOR A HIGH POWER GYROTRON Final Report, 20 May 1980 - 20 Mar. 1981
David Kim 20 May 1982 62 p refs
(Contract N00173-80-C-0282)
(AD-A115332; JAYCOR-J206-81-013/6196) Avail: NTIS HC A04/MF A01 CSCL 09/1

The scope of the report is the result of investigations for cavity designs of a high power gyrotron. To increase gyrotron output power, consideration was given to increased gun cathode diameters and cavity resonators. The investigations found that ohmic heating and mode competition were two primary problems that must be resolved. Author (GRA)

N82-30482# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
OPTIMUM FILTERS AND PULSED SIGNAL STORAGE DEVICES
Yu. S. Lezin 5 May 1982 401 p refs Transl. into ENGLISH of the mono. "Optimalnyye Filtry Nakopiteli Impulsnykh Signalov" Moscow, 1969 p 1-445
(AD-A115395; FTD-ID(RS)T-0182-81) Avail: NTIS HC A18/MF A01 CSCL 09/5

The design, and operating mechanism of optimum signal detection filters and analog and digital storage devices for repeated pulsed signals operating against a background of Gaussian noise are described. The practical realizations of these devices is discussed in detail. The methods considered are reduced to engineering formulas. The results of calculations made using these formulas are presented in graphs and tables which facilitate comparisons of different systems and selection of their individual parameters. The data provided enable this monograph to be used as a reference manual for the design of noise proof radio apparatus. J.D.

N82-30483# Power Technologies, Inc., Schenectady, N. Y.
APPLICATION OF INDUCTION GENERATORS IN POWER SYSTEMS Final Report
F. P. deMello, L. N. Hannett, and J. W. Feltes Oct. 1981 294 p refs Sponsored by EPRI
(EPRI Proj. 1945-1)
(DE82-900873; EPRI-EL-2043) Avail: NTIS HC A13/MF A01

The application of induction generators in power systems is discussed. The performance of induction generators as function of machine and system parameters and as function of var source control is evaluated and compared with that of synchronous generators. Results are presented so as to allow identification of system conditions favoring the application of induction generators and to estimate var source requirements. Fundamentals of induction generator transient behavior and determinations of the effect of modeling detail are discussed. The importance of rotor flux transient effects in high efficiency (low slip) designs is determined. Although the thrust of the investigations was to explore application of large scale induction machines (500 to 1000 MVA) the range of parameters studied and their presentation in normalized form allows the reslts to be applicable to all sizes of machines. DOE

N82-30484# Los Alamos Scientific Lab., N. Mex.
ANALYSIS OF SWITCHING SURGES GENERATED BY CURRENT INTERRUPTION IN AN ENERGY-STORGE COIL
P. Chowdhuri 1981 5 p refs Presented at the 9th Symp. on Eng. Problems of Fusion Res., Chicago, 26-29 Oct. 1981
(Contract W-7405-eng-36)
(DE82-002365; LA-UR-81-3008; CONF-811040-75) Avail: NTIS HC A02/MF A01

The transient voltages which are generated when the current in a large magnetic energy storage coil is interruped by a dc vacuum circuit breaker is analyzed. The effect of the various parameters in the circuit on the transient voltage is dicussed. The self inductance of the dump resistor must be minimized to control the generated transient. Contrary to general belief, a capacitor across the coil is not an effective surge suppressor. In fact, the capacitor may excite oscillations of higher magnitude. However, a capacitor, in addition to a surge suppressor, may be used to modify the frequency components of the transient voltage so that these frequency components are not coincident with the natural frequencies of the coil. Otherwise, resonant oscillations inside the coil may attain damaging magnitudes. The capacitor would also reduce the steepness of the wavefront of the transient across the coil, thus reducing the nonlinear voltage distribution inside the coil. DOE

N82-30485# Sandia Labs., Livermore, Calif. Exploratory Chemistry Div.
SOLID-ELECTROLYTE OXIDE-ION ELECTRODE FOR MOLEN NITRATES
D. A. Nissen Oct. 1981 22 p refs
(Contract DE-AC04-76DP-00789)
(DE82-003878; SAND-81-8013) Avail: NTIS HC A02/MF A01

An oxide ion sensitive elctrode of the type Pb, PbO/ZrO2 (Y2O3)// was constructed and its performance tested in the binary, equimolar molten salt NaNO3-KNO3 over the temperature range 336 to 350 C. The response of this electrode to oxide ion concentrations over the range 10 to the minus 6th to 10 to the minus 10th moles/kg is linearly dependent upon log [O/sup = /], and dE/dlog [O/sub =/] corresponds to a two-electron process. DOE

N82-30486# Ames Lab., Iowa.
DEVELOPMENT OF CRYOSTABILIZED Nb3-Sn-Cu SUPER-CONDUCTING WIRE USING THE IN SITU PROCESS
E. D. Gibson, J. E. Ostenson, J. J. Sue, J. D. Verhoeven, and D. K. Finnemore 1981 10 p refs Presented at 1981 Cryogenic Engr. Conf., San Diego, 10 Aug. 1981
(Contract W-7405-eng-82)
(DE82-003103; IS-M-341; CONF-810835-34) Avail: NTIS HC A02/MF A01

The development of the in situ process for production of high field Nb3Sn-Cu superconducting wire is described. In the utilization of multidie drawing equipment for reduction of Cu-Nb alloy castings to wire size, even though the alloy is quite ductile, it is desirable to utilize some intermediate anneals to insure zero breakage. It is shown that these anneals can be controlled to improve the J sub c properties of the wire. A technique is presented for the production of a cryostabilized in situ wire which

is compatible with large scale production methods. The technique utilizes a combination of rolling and extrusion to produce wire with a stabilizing Cu core. DOE

N82-30487# Ames Lab., Iowa. Dept. of Materials Science.
OPTIMIZATION OF IN SITU Nb3Sn-Cu WIRE
J. J. Sue, J. D. Verhoeven, E. D. Gibson, J. E. Ostenson, and D. K. Finnemore 1981 10 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981 Sponsored in part by NSF
(Contract W-7405-eng-82)
(DE82-003106; IS-M-342; CONF-810835-35) Avail: NTIS HC A02/MF A01

Efforts to optimize large scale in situ production of Nb3Sn-Cu superconductor wire are described. The as drawn Nb filament size is critical in optimizing J sub c values and depends upon the temperature of the Sn diffusion anneal. Laboratory size experiments show that utilizing carbon containers for ingot preparation results in a small C contamination and significantly lower J sub c values. Reduction of C contamination of 30 kg ingots are casted by utilizing ceramic coatings on the graphite lined Cu casting molds is described. DOE

N82-30488# Toulouse Univ. (France). Laboratoire de Genie Electrique.
[ACTIVITIES OF THE ELECTRICAL ENGINEERING LABORATORY] [RAPPORT SCIENTIFIQUE]
Jun. 1981 140 p refs In FRENCH
Avail: NTIS HC A07/MF A01

Research results, concerning dielectrics, circuit design methodology, and dielectric breakdown phenomena, are reported. Transformations and failures in dielectric media were studied, including discharges in gases, the nature and number of charged or excited states created by the discharge, and whether solid insulation is improved or degraded by this action. Transport phenomena in solid insulation were also investigated. The nature of charge carriers and carrier modes under the influence of an electric field were determined for materials common to electronics. Author (ESA)

N82-30489# Joint Research Centre of the European Communities, Ispra (Italy). European Solar Test Installation.
PHOTOVOLTAIC MODULE CONTROL TEST SPECIFICATIONS: SPECIFICATION 501
Aug. 1981 44 p ref Submitted for publication
(EUR-7545-EN; ESTI-Spec-501) Avail: NTIS HC A03/MF A01

The test schedule and a detailed description of 20 photovoltaic module control tests are presented. The test provide data on module performance and identify environmental factors and design features which could affect module durability. Temperature, humidity, mechanical loading, UV irradiation, salt mist, and ice formation tests are included. Author (ESA)

N82-30490# Siemens A.G., Munich (West Germany). Forschungslab.
GaAs FIELD EFFECT TRANSISTORS FOR POWER AMPLIFIERS AND OSCILLATORS IN MICROWAVE SYSTEMS Final Report, Oct. 1980
Dietrich Ristow, Spyridon Gisdakis, and Johannes Schweinberger Bonn Bundesministerium fuer Forschung und Technologies Dec. 1981 68 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-230; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,50

Two aspects were pursued simultaneously: the development of ion implanted GaAs power MESFETs and the development of modules with FETs purchased on the market, i.e. with FETs on epitaxially grown active layers. The basic cell of the FET with the gate dimensions L X W = 1 micrometer X 1500 micrometer on ion implanted layers has an output power of 27.2 dBm at 6 dB gain, 20% power added efficiency, and a saturated power of 640 mW at 6 GHz. The same cell on epi-layers gives almost identical results: 26 dBm at 6 dB gain, 25% efficiency, 680 mW saturated power. Two ion implanted cells connected in parallel produce 1.1 W saturated power. A three stage FET amplifier with open-ended stubs for matching has 18 dB gain in the linear region and a saturated output power of 2.5 W at 6.4 to 7.1 GHz. A two-stage amplifier with bandpass filter matching, which consisted of adjustable elements for tuning, has 18 dB gain and a saturated output power of almost 1 W at 3.9 to 4.1 GHz. A FET oscillator with cavity resonator produces 30 to 80 mW of power at 16.5 GHz with 15% and 12% efficiency, respectively. Author (ESA)

N82-30491# AEG-Telefunken AG, Belecke (West Germany). Geschaeftsbereich Elektronische Bauelemente.
COMMERCIAL BIPOLAR INTEGRATED CIRCUITS Final Report, May 1980
Franz Buergerhausen, Kurt-Dieter Hintzmann, Dietrich Hoeppner, Reinhold Kaiser, Gerhard Krumrein, Max Kuisl, Peter Lackner, Johann Mattfled, Heinz Rinderle, Cordular Seybold et al Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 37 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-052; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8

Developments in the field of integration of radio and television receiver circuitry are surveyed. With reference to more detailed reports, questions of circuit design, measurement, and integrated bipolar circuit technology are addressed. Subjects include methods of testing frequency modulation broadcast receivers, an integrated FM frontend interface for radio receivers, and design of digitally tuned radio receivers. Silicon planar technology is also discussed. Author (ESA)

N82-30492# AEG-Telefunken, Heilbronn (West Germany). Geschaeftsbereich Elektronische Bauelemente.
GaAs TECHNOLOGY FOR HIGH FREQUENCY COMPONENTS Final Report, Feb. 1981
Alexander Colquhoun, Klaus Gillessen, Erhard Kohn, and Winfried-Johannes Rabe Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 88 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-053; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,50

Technologies were developed for the production of large numbers of varactor diodes and smaller quantities of dual gate MESFETS for the UHF band. Research concentrated on vapor phase epitaxy and ion implantation techniques, the development of temperature stable Schottky contacts, and on surface passivation problems. The performance of the GaAs varactor diodes and MESFETS was compared with silicon varactors and MOS tetrodes, showing the expected advantages of GaAs devices. The GaAs varactor diodes have a series resistance of under 300 milli-ohms for a linear tuning characteristic between -3 and -15 V in an appropriate circuit. Dual gate MESFETS fabricated on implanted material, using vapor phase epitaxy, have a gate length of 1.5 micrometers, a gain bandwidth product of 5 GHz, and a minimum noise figure of 1.6 dB at 1 GHz. Author (ESA)

N82-30493# Loher G.m.b.H., Ruhstorf/Rott (West Germany). Elektromotorenwerke.
MONITORING SYSTEM FOR BIG ELECTRIC MOTORS CONTROLLED BY MICROPROCESSOR Final Report, Jun. 1981
Hugo Stadler Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 31 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-060; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,50

A prototype, microprocessor controlled monitoring system for machines run by electric motors was developed. Various criteria and conditions were considered for their applicability to monitoring. A combination of different monitoring instruments for the acquisition of limit values was achieved in a single device. A considerable increase in performance due to the possibility of programming was hoped for. However, the increasing degree of automation required a variety of monitoring steps in order to ensure troublefree operation. The availability of highly integrated

electronic modules makes it possible to condition machine response at any moment during operation. Fields of application include the chemical industry, marine and offshore operations, and monitoring electrical drive systems in nuclear power plants.
Author (ESA)

N82-30494# Politecnico di Torino (Italy). Ist. di Elettronica e Telecomunicazioni.
MODELING AND PERFORMANCE SIMULATION TECHNIQUES OF GaAs MESFET'S FOR MICROWAVE POWER AMPLIFIERS Final Report
G. P. Bava, S. Benedetto, E. Biglieri, C. Naldi, U. Pisani, V. Pozzolo, F. Filicori (Bologna Univ.), and V. Monaco (Bologna Univ.) Paris ESA Feb. 1982 112 p refs
(Contract ESTEC-4043/79)
(ESA-CR(P)-1569) Avail: NTIS HC A06/MF A01

The problem of measuring, modelling and analyzing MESFET's when operating as microwave power amplifiers at frequencies up to X band was studied. Transistor nonlinear models are reviewed, and measurements of their parameters are described. Computer simulation of microwave MESFET amplifiers was performed by a harmonic balance technique. Results of measurements performed at amplifier level are presented and compared with those obtained from simulation. Measured and computed values of small signal S parameters of the transistor agree well. Computed gain in linear output is 1.4 dB less than experimental value. Agreement is very good for nonlinear behavior and for intermodulation products. Author (ESA)

N82-30495# National Bureau of Standards, Washington, D.C. Center for Electronics and Electrical Engineering.
MEASUREMENT OF ION CURRENT DENSITY AT GROUND LEVEL IN THE VICINITY OF HIGH VOLTAGE DC TRANSMISSION LINES
R. H. McKnight, F. R. Kotter, and M. Misakian Dec. 1981 29 p refs
(Contract FA-77-A-01-6010)
(PB82-156993; NBSIR-81-2410) Avail: NTIS HC A03/MF A01 CSCL 09A

Sensors for measuring vertical current density at ground level near high voltage dc (HVDC) transmission lines are subject to error when the sensor is not in the ground plane. The magnitude of this error, for guarded and unguarded sensors, was investigated using both dc electric fields with space charge and ac electric fields in a parallel plate facility. For conditions like those expected under HVDC transmission lines, the results obtained using ac and dc methods agreed to within experimental uncertainty. The measured errors are as large as 25 percent for guarded sensors and significantly larger for unguarded sensors. Graphs of data for various sensor elevations and guarding are presented. DOE

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

N82-30496 Royal Aircraft Establishment, Farnborough (England).
THE INFLUENCE OF COMPRESSIBILITY ON THE EQUATIONS OF THE RAPID DISTORTION THEORY OF TURBULENCE
Caroline Boyd Feb. 1982 19 p refs
(RAE-TR-81153; RAE-Aero-3521; BR83022) Copyright. Avail: NTIS HC A02/MF A01

Batchelor's theory of the effect of rapid distortion on turbulence level in incompressible flow, is extended in order to account for compressibility. The theory was applied to the flow through a wind tunnel contraction cone. Compressibility has only a small effect on the change of turbulence intensity, but it favorably affects the reduction of the percentage of total turbulence. The contraction ratio needed in order to achieve a given reduction in the level of turbulence, or in the level of nonuniformity, decreases as the outlet Mach number increases. Author (ESA)

N82-30497*# Woven Structures, Inc., Compton, Calif.
THERMAL INSULATION BLANKET MATERIAL Final Report
R. H. Pusch Jun. 1982 10 p
(Contract NAS2-11094)
(NASA-CR-166367; NAS 1.26:166367) Avail: NTIS HC A02/MF A01 CSCL 20D

A study was conducted to provide a tailorable advanced blanket insulation based on a woven design having an integrally woven core structure. A highly pure quartz yarn was selected for weaving and the cells formed were filled with a microquartz felt insulation. R.J.F.

N82-30498*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FLOW VISUALIZATION STUDY OF THE HORSESHOE VORTEX IN A TURBINE STATOR CASCADE
Raymond E. Gaugler and Louis M. Russell Jun. 1982 33 p refs
(NASA-TP-1884; E-915; NAS 1.60:1884) Avail: NTIS HC A03/MF A01 CSCL 20D

Flow visualization techniques were used to show the behavior of the horseshoe vortex in a large scale turbine stator cascade. Oil drops on the end wall surface flowed in response to local shear stresses, indicating the limiting flow streamlines at the surface. Smoke injected into the flow and photographed showed time averaged flow behavior. Neutrally bouyant helium filled soap bubbles followed the flow and showed up on photographs as streaks, indicating the paths followed by individual fluid particles. Preliminary attempts to control the vortex were made by injecting air through control jets drilled in the end wall near the vane leading edge. Seventeen different hole locations were tested, one at a time, and the effect of the control jets on the path follwed by smoke in the boundary layer was recorded photographically. S.L.

N82-30499# Atomic Weapons Research Establishment, Aldermaston (England).
AN EXPERIMENTAL STUDY OF THE SHOCK WAVE IN FREE AIR FROM SPHERICAL CHARGES OF TNT AND 60/40 RDX/TNT
R. Potter and C. V. Jarvis Jan. 1973 36 p refs
(AD-A114744; AWRE-0-1/73; DRIC-BR-33320) Avail: NTIS HC A03/MF A01 CSCL 19/1

Results are presented which give information on those aspects of the shock wave which are of the most common interest, namely: peak pressure, positive impulse, positive duration, maximum negative pressure, shape of the pressure-time curve and information on the secondary shock. An equation for the peak pressure-distance curve is given and a comparison of results is made. The values of constants which define the shapes of pressure-time curves are given. All measured values are displayed graphically and photographs of actual records are reproduced.
Author (GRA)

N82-30500# Naval Postgraduate School, Monterey, Calif.
LIQUID CRYSTAL MAPPING OF JET CROSSFLOW INTERACTIONS M.S. Thesis
Michael David Johnson Dec. 1981 62 p refs
(AD-A114491) Avail: NTIS HC A04/MF A01 CSCL 14/5

The use of liquid crystal thermography is discussed as a technique for visualizing the disturbance field created on a surface from which a jet is injected into a crossing flow. The study is part of an ongoing investigation of the performance of jet steering systems such as ship bow thrusters. An experimental apparatus was designed and built to provide a heated surface coated with liquid crystals. For a range of jet-to-crossflow velocity ratios, the temperature field on the flat plate was visually represented. The technique allowed continual visual observation of the cooling effects of the jet as jet velocity increased. It also showed the cooling pattern similarities that exist at the same velocity ratios for different crossflow velocities. Strong visual similarities were shown to exist between the temperature distribution on the flat plate as depicted by the liquid crystals and the theoretical surface velocity field around a jet modelled as a symmetrical

foil near the point of injection and a vortex sheet in the plumes. Author (GRA)

N82-30501*# Stanford Univ., Calif. Dept. of Mechanical Engineering.

REPORT TO U. S. AFOSR COVERING WORK ON THE AFOSR-HTTM-STANFORD CONFERENCE ON COMPLEX TURBULENT FLOWS: COMPARISON OF COMPUTATION AND EXPERIMENT Final Report, 1 Dec. 1979 - 31 Dec. 1981

S. J. Kline Feb. 1982 32 p Conf. held at Stanford, Calif., 1981 Sponsored in part by NASA. Langley and NASA. Lewis Research Center, ONR and NSF

(Grant NAG2-79; Contract F49620-80-C-0027; AF Proj. 2307) (NASA-CR-169109; NAS 1.26:169109; AD-A114776; AFOSR-82-0371TR) Avail: NTIS HC A03/MF A01 CSCL 20D

A summary is presented of the goals and results of the 1980-81 AFOSR-HTTM-Stanford Conference on Complex Turbulent Flows. The report of the Evaluation Committee for the comparison of computation with experimental data sets is included. GRA

N82-30502# Wisconsin Univ., Madison. Mathematics Research Center.

UPWIND DIFFERENCING, FALSE SCALING, AND NON-PHYSICAL SOLUTIONS TO THE DRIVEN CAVITY PROBLEM Technical Summary Report

John C. Strikwerda Dec. 1981 9 p refs

(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062) (AD-A114626; MRC-TSR-2309) Avail: NTIS HC A02/MF A01 CSCL 20/4

We show that for multi-dimensional viscous flow computations the use of upwind finite difference schemes can alter the natural length scales. This false scaling is related to, but distinct from, the artificial viscosity introduced by upwind schemes. We show that this false scaling can account for certain non-physical solutions which have been computed for the driven cavity problem. GRA

N82-30503# Wisconsin Univ., Madison. Mathematics Research Center.

ON THE SWIRLING FLOW BETWEEN ROTATING COAXIAL DISKS: A SURVEY

Seymour V. Parter Feb. 1982 32 p refs

(Contracts DAAG29-80-C-0041; N00014-76-C-0341; NR Proj. 044-356) (AD-A114551; MRC-TSR-2332) Avail: NTIS HC A03/MF A01 CSCL 12/1

Consider solutions (H(x, epsilon), G(x, epsilon)) of the von Karman equations for the swirling flow between two rotating coaxial disks (1.1) epsilon H'''' + HH''' + GG' equal 0, (1.2) epsilon G'' + HG' - H'G equal 0. In this survey we describe much of the activity of the past 30 years - involving physical conjecture, numerical computation, asymptotic expansions and rigorous mathematical results. In particular we focus on the questions of existence and nonuniqueness, monotonicity, and scaling. Author (GRA)

N82-30504# Wisconsin Univ., Madison. Mathematics Research Center.

ASYMPTOTIC NUMERICAL ANALYSIS FOR THE NAVIER-STOKES EQUATIONS, 1 Technical Summary Report

C. Foias and R. Temam Jan. 1982 26 p refs

(Contract DAAG29-80-C-0041) (AD-A114549; MRC-TSR-2325) Avail: NTIS HC A03/MF A01 CSCL 12/1

Our aim in this work is to show that, in a 'permanent regime', the behavior of a viscous incompressible fluid can be, in principle, determined by the study of a finite number of modes. It is proved that the behavior for t yields infinity of the solution to the Navier-Stokes equations is completely determined by its projection on appropriate finite dimensional subspaces, corresponding to eigenspaces of the linear operator, or more general subspaces, including finite element subspaces. Some indications on the dimension of such subspaces are given. GRA

N82-30505# Wisconsin Univ., Madison. Mathematics Research Center.

ON THE SWIRLING FLOW BETWEEN ROTATING COAXIAL DISKS: EXISTENCE AND NONUNIQUENESS Technical Summary Report

Heinz-Otto Kreiss (California Inst. of Tech., Pasadena) and Seymour V. Parter Jan. 1982 43 p refs

(Contracts DAAG29-80-C-0041; N00014-76-C-0341) (AD-A114489; MRC-TSR-2315) Avail: NTIS HC A03/MF A01 CSCL 12/1

Consider solutions G(x,epsilon), H(x,epsilon)> of the von Karman equations for the swirling flow between two rotating coaxial disks (1.1) epsilonH superscript iv + HH''' + GG' equal 0 and (1.2) epsilonG'' + HG' H'G equal 0 with boundary conditions (1.3 H(0,epsilon) equal H' (0,epsilon) equal H(1, epsilon) equal H'(1, epsilon) equal 0 (1.4) G(0, epsilon) equal s, G(1, epsilon) equal 1, s < 1. In this work we establish the existence of solutions for epsilon small enough. In fact, if n is a given positive integer with sign s equal (-1 to the n power) then there is - for epsilon greater than 0 sufficiently small - a solution with the additional property: G(x, epsilon) has n interior zeros. If n > 1 there are at least two such solutions. If s equal 0 there is at least one such solution for every positive integer n. The asymptotic shape of these solutions is described. GRA

N82-30506# Naval Ship Research and Development Center, Bethesda, Md. Ship Performance Dept.

DETERMINATION OF DRAG COEFFICIENTS FOR A BUOYANT CABLE ANTENNA

Alan M. Israel Mar. 1982 52 p refs

(Contract N00030-79-C-0091) (AD-A114915; DTNSRDC/SPD-1035-01) Avail: NTIS HC A04/MF A01 CSCL 09/5

Samples of buoyant cable antennas of various lengths and surface roughnesses were towed over a range of speeds and depths in different wave conditions. Based on measurements of the forces developed and using computerized prediction techniques, normal and tangential drag coefficients were determined for the submerged segment of the BCA configuration and drag coefficients were determined for the floating length segment. The drag coefficients are presented in both tabular and graphical form. The results indicate that both waves and surface roughness can have a significant effect on the drag coefficients. The results also indicate that the effects of cable stiffness on the accuracy of the cable catenary predictions require further investigation. Author

N82-30507# Nielsen Engineering and Research, Inc., Mountain View, Calif.

DEVELOPMENT OF PERTURBATION PROCEDURES FOR NONLINEAR INVISCID AND VISCOUS FLOWS Annual Report, 1 Feb. 1981 - 31 Jan. 1982

David Nixon Feb. 1982 15 p refs

(Contract F49620-79-C-0054; AF Proj. 2307) (AD-A114825; AFOSR-82-0391TR) Avail: NTIS HC A02/MF A01 CSCL 20/4

Certain topics on transonic flow theory and on numerical truncation errors have been investigated. In transonic flow theory the extension of the transonic perturbation method to include flows where shock waves vanish and the development of the technique to treat separated flows was undertaken with satisfactory results. Two other topics that were investigated concerned the application of perturbation theory to accelerate convergence of numerical solutions to predict potential flow. Finally, for transonic flow, the development of a 'potential-like' theory to more closely approximate the Euler equations was undertaken. A non-linear truncation error analysis was performed on certain Euler equation algorithms to develop corrections for the solution. An outcome of this work was the derivation of a criteria for use in adaptive mesh techniques. Author (GRA)

N82-30508# Wisconsin Univ., Madison. Mathematics Research Center.

FORMATION OF SINGULARITIES FOR A CONSERVATION LAW WITH DAMPING Technical Summary Report

S. Lin and Reza Melek-Madani Nov. 1981 20 p refs

(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062) (AD-A114515; MRC-TSR-2302) Avail: NTIS HC A02/MF A01 CSCL 20D

The equations of gas dynamics in a tube with varying cross

section are an example of a nonhomogeneous system of conservation laws. In this work we study the Riemann problem for this system by viewing it as a perturbation of the classical equations of gas dynamics in a uniform tube. We also study the Riemann problem and the formation of singularities for a related, but simpler, problem of a nonhomogeneous Berger's equation. Author

N82-30509# Calspan Field Services, Inc., Arnold Air Force Station, Tenn. Aerodynamic Research Dept.

NUMERICAL MODEL FOR FLUID SPIN-UP IN A PARTIALLY-FILLED CYLINDER Interim Technical Report, 1 Mar. 1981 - 28 Feb. 1982

Gregory F. Homicz May 1982 52 p refs
(Contract DAAG29-81-C-0007)
(AD-A115317; CALSPAN-6856-A-1) Avail: NTIS HC A04/MF A01 CSCL 19/1

A theoretical investigation is presented for the axisymmetric spin-up of fluid in a partially-filled cylindrical cavity. It is an extension of the earlier analyses of Wedemeyer, and of Goller and Ranov, to those cases where the liquid free surface intersects one or both endwalls. The simplifying assumptions of a columnar flow and the quasi-steady treatment of the Ekman layer pumping of the secondary flow are retained. Earlier estimates of the Ekman layer pumping are modified heuristically for situations where the layer(s) no longer covers the entire wall. Also, due to the very steep free surface contour in the latter stages of spin-up, it was found advantageous to develop the free surface equations in an axial, rather than radical, coordinate frame. GRA

N82-30510# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Ocean Science and Technology Lab.

RELATIVE NUMERICAL DISPERSION OF SHALLOW WATER GRAVITY WAVES CAUSED BY THREE DIFFERENCE TECHNIQUES

J. M. Harding Apr. 1982 19 p refs
(AD-A115296; NORDA-TN-134) Avail: NTIS HC A02/MF A01 CSCL 20/4

Using analytical and numerical techniques we compare the effect of three different time-differencing methods on the propagation of shallow-water gravity waves. We compare the numerical dispersion of both phase and group velocities caused by a centered-in-time explicit formulation, a centered-in-time implicit method, and a trapezoidal-in-time implicit treatment. All three techniques slow the waves relative to their theoretical phase and group velocities. For each method, the slowing increases with decreasing spatial resolution and with decreasing temporal resolution. For delta t square root of $gh/d < or = 1$, the slowing increases as we switch from explicit, to trapezoidal implicit, to centered implicit methods. In this formula, square root of gh = theoretical shallow water gravity wave speed, delta t = time increment, and d = smallest space increment between like variable grid points. For delta t square root of $gh/d > 1$, the trapezoidal implicit scheme again outperforms the centered implicit scheme. Author (GRA)

N82-30511# Stanford Univ., Calif. Dept. of Mechanical Engineering.

THEORETICAL AND EMPIRICAL STUDIES OF THE BASIC STRUCTURE OF TURBULENT SHEAR FLOWS, INCLUDING SEPARATED FLOWS AND EFFECTS OF WALL CURVATURE Annual Report, 1 Dec. 1980 - 20 Nov. 1981

S. J. Kline, J. H. Ferziger, J. P. Johnston, and R. J. Moffat 31 Jan. 1982 36 p ref
(Contract F49620-79-C-0010; AF Proj. 2307)
(AD-A115153; AFOSR-82-0416TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

A summary is presented of research activity for the period 1 Dec 80 through 30 Nov 81. Recent progress is described in two principal areas: the prediction of turbulent flow in straight wall diffusers, with and without separation, and the study of convective heat transfer on cacave surfaces. GRA

N82-30512# Lehigh Univ., Bethlehem, Pa. Dept. of Mechanical Engineering and Mechanics.

AN OPTIMIZATION TECHNIQUE FOR THE DEVELOPMENT OF TWO-DIMENSIONAL STEADY TURBULENT BOUNDARY LAYER MODELS Interim Report

L. J. Yuhas and J. D. A. Walker Mar. 1982 62 p refs
(Contract F49620-78-C-0071; AF Proj. 2307)
(AD-A115151; TR-FM-82-1) Avail: NTIS HC A04/MF A01 CSCL 20/4

A simple boundary layer turbulence model to account for different physical effects is described; the method is applied to produce models for both pressure gradient and mainstream turbulence effects. Asymptotic theory is used to isolate the leading terms in an expansion for the mean velocity profile for high Reynolds numbers for both the inner and outer regions of a nominally steady two dimensional boundary layer. The velocity profile in the outer layer satisfies a partial differential equation containing a Reynolds stress term and this term is modeled by a simple eddy viscosity function which contains two parameters. The velocity profile in the inner wall layer is modeled using an analytical expression which was previously derived by consideration of the observed characteristics of the time dependent flow in the wall layer and which contains a single independent parameter. GRA

N82-30513*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

STUDY OF THE EFFECT OF FREE-STREAM TURBULENCE UPON DISTURBANCES IN THE PRE-TRANSITIONAL LAMINAR BOUNDARY LAYER. PART 1: LAMINAR BOUNDARY LAYER DISTORTION BY SURFACE ROUGHNESS. PART 2: EFFECT UPON STABILITY Final Report, Dec. 1978 - Sep. 1981

James M. Kendall Wright-Patterson AFB, Ohio AFWAL Apr. 1982 81 p refs
(Contract NAS7-100; AF Proj. 2307)
(NASA-CR-164726; NAS 1.26:164726; AD-A115404; AFWAL-TR-82-3002) Avail: NTIS HC A05/MF A01 CSCL 20/4

Part I: Hot wire anemometry has been employed to determine certain characteristics of the turbulence in the free-stream of a low-speed, low-turbulence wind tunnel and to study the influence on such turbulence upon the fluctuations within a flat-plate boundary layer. A technique was employed which provided information concerning the propagation speed of the disturbances and this was used as a means of classification as to type or cause. It was found that Tollmien-Schlichting waves did not possess significant energy until a Reynolds number considerably higher than that of the theoretical neutral point was attained and that the subsequent growth exceeded the prediction of linear analysis. Part II: Distributed roughness present upon an aerodynamic surface alters the laminar boundary layer mean velocity profile such as to increase the instability presented here of the profile distortion for the case of small roughness in a Blasius boundary layer. The roughnesses tested include a single protuberance at Reynolds numbers below 50, the interaction between two such elements, the interaction between one element and a multitude of others, and the distortion due to distributed roughness. Author (GRA)

N82-30514# General Atomic Co., San Diego, Calif.

EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF SHELL-SIDE FLOW DISTRIBUTION EFFECTS ON AXIAL-FLOW HEAT EXCHANGERS

D. F. Carosella, Jr. Jul. 1981 9 p refs Presented at the Winter Ann. Meeting of the ASME Technol. and Soc. Div., Washington, D.C., 15 Nov. 1981
(Contract DE-AT03-76ET-35301)
(DE81-027534; GA-A-16214; CONF-811101-7) Avail: NTIS HC A02/MF A01

To investigate the bundle flow pattern and verify design methods, an air flow model of the heat exchanger inlet region was built and tested. This model provided useful data for design of heat exchangers of this type. The model was also used to verity the accuracy of a computer model for use in design analysis of heat exchanger flow patterns. DOE

N82-30515# Argonne National Lab., Ill.

DEVICE FOR ANALYSIS OF THE GAS FLOW IN BLAST FURNACES OR SHAFT KILNS

Emil Weiss Oct. 1981 9 p Transl. into ENGLISH of German patent no. 718766, 20 Mar. 1942
(Contract W-31-109-eng-38)

(DE82-001816; ANL-Trans-1203) Avail: NTIS HC A02/MF A01

Gas samples are taken by means of tubes inserted through the shaft wall into the feed. The sample tubes of stepped lengths are permanently installed in the shaft kiln within a strong, sword-shaped housing with openings in the walls for the mouths of individual tubes. Cooling water flows through the inside of the housing. Each individual tube terminates with a flat arc in an opening in the housing. DOE

N82-30516# Kabel- und Metallwerke Gutehoffnungshuette A.G., Hanover (West Germany).

BASIC MEASUREMENTS ON A MULTIPLE HEAT PIPE Final Report, Dec. 1980

Peter Rohner and Klaus Schippl Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 43 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-041; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9

A multiple heat pipe which is a specially formed long heat pipe that fulfills the function of several single heat pipes was studied. The suitability of this arrangement for a heat exchanger was investigated. Several laboratory models were manufactured from corrugated tubes and their behavior was measured. Results show that the serpentine model exhibits the expected heat exchange properties. When subjected to severe operating conditions, the pipes remain operational, although somewhat limited in performance. The results are in function of the nature of the exchange media (air-air, air-water, water-water). This corrugated heat pipe design shows good promise for successful further development into an air-air heat exchanger. Author (ESA)

N82-30517# Dortmund Univ. (West Germany). Lehrstuhl fuer Thermodynamik.

THERMODYNAMIC PROPERTIES OF A SUITABLE WORKING FLUID MIXTURE FOR ABSORPTION HEAT PUMPS Final Report, Jun. 1981

Heinz-Dieter Eichholz and Siegfried Schulz Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 72 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-043; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15

An absorption heat pump process was considered with reference to thermodynamic properties of methanol lithium bromide as a working fluid. The process was optimized for operating conditions and the binary mixture used. All available thermodynamic data of mixture properties were collected. They were then complemented by vapor-liquid equilibrium measurements and heat of mixing experiments with the result of a theoretical correlation. By a critical selection of properties, the binary mixture CH30H LiBr was qualified as a heat pump working fluid. In addition, thermodynamic properties of methanol are derived by a fundamental equation. Author (ESA)

N82-30518# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

ON THE WALL PRESSURE FIELD IN TURBULENT PIPE FLOW

M. K. Bull (Adelaide Univ., South Australia) and T. Langeheineken 1981 98 p refs Sponsored by Max-Planck Gesellschaft

(MPIS-Mitt-73; ISSN-0374-1257) Avail: NTIS HC A05/MF A01

Piezoelectric transducer and condenser microphone spectral measurements of wall pressure fluctuations in turbulent pipe flow were compared. A one decade range of Reynolds number was involved. Results show that large discrepancies between values of the ratio of rms pressure to dynamic pressure in turbulent boundary layers and turbulent pipe flows are attributable to effects of differences in Reynolds number which necessarily occur when sensors of different diameters have equal values of transducer size parameter. Nondimensional spectra, plotted in forms appropriate to various convection mechanisms, are similar, either in the intermediate frequency range or in the high frequency range, depending on the form of nondimensionalization. A two component spectral model of the pressure field, one consistent with convection of large scale turbulence at outer region velocities, the other with convection of wall region turbulence of wall region velocities, was derived. It exhibits all the salient features of the experimentally observed behavior. Author (ESA)

N82-30519# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abteilung Stroemung und Verbrennung.

THE INFLUENCE OF TRANSVERSE CURVATURE ON THE VELOCITY LAW IN THICK AXISYMMETRIC TURBULENT BOUNDARY LAYERS

Heinrich Eickhoff Feb. 1982 13 p refs

(DFVLR-Mitt-82-05) Avail: NTIS HC A02/MF A01; DFVLR, Cologne DM 7,90

The velocity profile in the incompressible axisymmetric turbulent boundary layer on slender cylinders is analyzed. It is found that the mixing length relation valid for plane boundary layers can be transferred to axisymmetric boundary layers over a wide range of transverse curvature. Only at very high curvature is an influence on the mixing length present. A modified mixing length relation is derived to account for this. Author (ESA)

N82-30520# Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht (West Germany). Inst. fuer Anlagentechnik.

FINITE ELEMENT ANALYSIS FOR THE DETERMINATION OF THE UNSTEADY TEMPERATURE DISTRIBUTION IN A FLAT PLATE DURING A WELDING JOB UNDER ATMOSPHERIC CONDITIONS [FINITE-ELEMENT-ANALYSE ZUR BESTIMMUNG DER INSTATIONAEREN TEMPERATURVERTEILUNG IN EINER EBENEN PLATTE BEI AUFTRAGSSCHWEISSUNG UNTER ATMOSPHAERENZUSTAND]

R. Dietrich and K. J. Bathe (MIT, Cambridge) 1982 60 p refs

(GKSS-82/E/5; ISSN-0344-9629) Avail: NTIS HC A04/MF A01

The transient temperature distributions in a plate during welding under atmospheric conditions are analyzed in order to develop the theoretical foundations for the numerical analysis of underwater welding processes (dry or wet). The analysis is based on the finite element method. The basic concepts of this method are explained. The temperatures along and transverse to the weld seam are given and the three-dimensional temperature distributions are presented. Author (ESA)

N82-30521# Techno System Developments, Naples (Italy).

MICROGRAVITY COMPUTING CODES. USER'S GUIDE Final Report

Paris ESA Jan. 1982 77 p refs 2 Vol.

(Contract ESA-4304/80)

(TS-1-82-Vol-1; ESA-CR(P)-1576-Vol-1) Avail: NTIS HC A05/MF A01

Codes used in microgravity experiments to compute fluid parameters and to obtain data graphically are introduced. The computer programs are stored on two diskettes, compatible with the floppy disk drives of the Apple 2. Two versions of both disks are available (DOS-2 and DOS-3). The codes are written in BASIC and are structured as interactive programs. Interaction takes place through the keyboard of any Apple 2-48K standard system with single floppy disk drive. The programs are protected against wrong commands given by the operator. The programs are described step by step in the same order as the instructions displayed on the monitor. Most of these instructions are shown, with samples of computation and of graphics. Author (ESA)

N82-30522# Techno System Developments, Naples (Italy).

FLUID PHENOMENA INFLUENCING THE DESIGN OF ZERO-G EXPERIMENTS. FOLLOW ON STUDY Final Report

Paris ESA Jan. 1982 74 p refs 2 Vol.

(Contract ESA-4304/80)

(TS-2-82-Vol-2; ESA-CR(P)-1576-Vol-2) Avail: NTIS HC A04/MF A01

The theory underlying the CHARTIME microgravity computing code is generalized to account for unsteady motion, rotation of the fluid frame with respect to the body frame, and mass diffusion.

A liquid-gas interface is considered. Information needed to extend and/or adapt CHARTIME to problems not explicitly considered in the user guide is given. Details of the nature, type and implications of approximations are discussed. The conditions in which these approximations hold are identified. Modifications are suggested that must be made when these conditions are not met. Author (ESA)

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-30523 Royal Aircraft Establishment, Farnborough (England).
THE DESIGN AND USE OF A VISCOMETER FOR THE STUDY OF REACTING RESIN SYSTEMS
R. Childs Nov. 1981 26 p refs
(RAE-TR-81145; RAE-Struct-BF/B/0898; BR82876) Avail: NTIS HC A03/MF A01

A viscometry system which studies reacting resin systems under predetermined temperature cycles is described. Constraints placed upon the design by the need to reduce the number of variables, and by the nature of the material under test, are discussed. The effect on a resin of a cure cycle which incorporates a dwell to allow temperatures to equalize throughout the laminate, was studied. By using fast exponentials as ramps, the systems can be used to study cure cycles in ovens and presses. Author (ESA)

N82-30524*# Alabama Univ., Huntsville. School of Science and Engineering.
SPACE ENVIRONMENTAL EFFECTS: CONSTRUCTION AND UTILIZATION OF A SYSTEM TO MEASURE LOW THERMAL STRAIN IN ONE METER GRAPHITE EPOXY TUBES Final Report, Nov. 1979 - Nov. 1981
Jack H. Davis and Carol Rives Jan. 1982 43 p refs
(Contract NAS8-33377)
(NASA-CR-162054; NAS 1.26:162054) Avail: NTIS HC A03/MF A01 CSCL 14B

A system for measuring the expansion of low coefficient of thermal expansion (CTE) materials was constructed around a H.P. 5526-A laser measuring system. The vacuum CTE measurements in the -150 F to +120 F range were made over a 6 month period on a graphite epoxy tube yielding CTE values of 2.5 to one fifty-millionth/F above ambient and 2 + or - one ten-millionth F below ambient temperature. To assure that the below ambient, approximately 10 microns high open loop nature of the delta L/L vs. T curves was not apparatus related, similar size quartz tubes (A and B) were checked and found to have only a 2 micron (negligable for quartz) open loop component. These two quartz tubes, A and B, had ambient CTE values 20% and 45% respectively higher than the average handbook value. The overnight microcreep diminished an order of magnitude during the first several cycles after the system had been reopened. S.L.

N82-30525*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DATA ACQUISITION SYSTEM FOR NASA LARC IMPACT DYNAMICS RESEARCH FACILITY
Royce F. McCormick, Jack C. Spears, James W. Lynch, and Frank R. Batten Jun. 1982 13 p
(NASA-TM-84510) Avail: NTIS HC A02/MF A01 CSCL 14B

A data system is designed to permit the simultaneous recording of 90 data channels on one 28 track magnetic tape recorder using a constant bandwidth FM multiplexing technique. Dynamic signals from transducers located in the test aircraft are amplified and fed to voltage controlled oscillators where they are converted to discrete FM signals. The signals from each group of five VCO's are fed to a mixer/distribution amplifier where they are combined into one composite signal and recorded, using direct recording techniques, on one magnetic tape recorder track. Millivolt signals from the recorders reproduce heads are amplified to one volt and then electronically switched to an FM demultiplexing system where appropriate frequency discrimination and signal filtering recover the original analog information. S.L.

N82-30526*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TORQUES ON THE GYRO IN THE GYRO RELATIVITY EXPERIMENT
Peter Eby May 1982 29 p refs
(NASA-TM-82488; NAS 1.15:82488) Avail: NTIS HC A03/MF A01 CSCL 14B

Whether the Newtonian drifts on the gyro as conceived in the gyro relativity experiment can be reduced to a level such that the geodetic and motional earth precessions of general relativity can be detected is addressed. Torques due to gas drag, electrical charging, mass unbalance, cosmic ray impacts, magnetic fields, and gravity gradients in a inclined orbit are calculated and discussed. The conditions necessary for the required accuracy are given. M.G.

N82-30527*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Space Sciences Lab.
INSTRUMENT MANUAL FOR THE RETARDING ION MASS SPECTROMETER ON DYNAMICS EXPLORER-1
S. A. Fields, C. R. Baugher, C. R. Chappell, D. L. Reasoner, H. D. Hammack (Texas Univ., Dallas), W. W. Wright (Texas Univ., Dallas), and J. H. Hoffman (Texas Univ., Dallas) May 1982 97 p refs
(NASA-TM-82484; NAS 1.15:82484) Avail: NTIS HC A05/MF A01 CSCL 14B

The retarding ion mass spectrometer (RIMS) for Dynamics Explorer-1 is an instrument designed to measure the details of the thermal plasma distribution. It combines the ion temperature determining capability of the retarding potential analyzer with the compositional capabilities of the mass spectrometer and adds multiple sensor heads to sample all directions relative to the spacecraft ram direction. This manual provides a functional description of the RIMS, the instrument calibration, and a description of the commands which can be stored in the instrument logic to control its operation. S.L.

N82-30528# Draper (Charles Stark) Lab., Inc., Cambridge, Mass. Component Development Dept.
EVALUATION OF AN ADVANCED GYRO AND WHEEL SPEED MODULATION FOR HIGHLY ACCURATE AZIMUTH DETERMINATION Final Report, 26 Jan. - 31 Dec. 1981
J. Shearer 31 Dec. 1981 82 p
(Contract F19628-81-K-0008; AF Proj. 7600)
(AD-A114640; CSDL-R-1530; AFGL-TR-82-0016) Avail: NTIS HC A05/MF A01 CSCL 17/2

The technique of wheel-speed modulation (WSM) of a permanent magnet wheel gyroscope for measurement of true astronomic azimuth to state of the art accuracy is evaluated. A performance model for WSM operation of the gyro, and a series of unique tests which were especially designed to evaluate: (1) the repeatability of the gyro torque across repeated speed changes, (2) the long term stability of the known error parameters associated with LWSM, and (3) the accuracy of the WSM technique as compared with traditional four position gyrocompassing is described. The test data demonstrated that true azimuth can be measured to a precision of at least 0.75 arc seconds (one sigma) in an hour or less for a period of at least four consecutive days during quiescent conditions. The data also confirmed that the torque bias shift which arises from changing the gyro wheel speed is very repeatable. Thus, once this bias is calibrated, the gyro can be operated automatically using WSM to accurately track the azimuthal motions of the test article without interruption for extended periods. GRA

N82-30529# Naval Research Lab., Washington, D. C. Electronics Technology Div.
MAGNETO-OPTIC MATERIALS FOR BIASING RING LASER

GYROS. REPORT 4: PROPERTIES OF EVAPORATED Fe-Co ALLOY FILMS

G. A. Prinz, J. J. Krebs, W. G. Maisch, and D. W. Forester 30 Apr. 1982 29 p refs
(Contract N00019-80-WR-01055)
(AD-A114641; NRL-MR-4832) Avail: NTIS HC A03/MF A01 CSCL 20/5

The family of binary alloys FexCo1-x for 1< or equal x less than or equal 0 has been fabricated and characterized. Ellipsometric techniques are used to obtain the magneto-optical properties. Their performance as potential magneto-optical biasing elements is described. GRA

N82-30530# Philips Labs., Briarcliff Manor, New York.
DEVELOPMENT OF AN ELECTROPHORETIC IMAGE DISPLAY Quarterly Technical Report, 1 Nov. 1981 - 31 Jan. 1981

Richard Stolzenberger, J. Lalak, and K. Wittig Mar. 1982 20 p refs
(Contract MDA903-79-C-0439; DARPA Order 3802)
(AD-A114600) Avail: NTIS HC A02/MF A01 CSCL 14/5

The purpose of this work is to develop an X-Y addressed electrophoretic image display (EPID). The problem of indium oxide redeposit onto the walls of the potential wells during ion-beam milling has been solved. A thin layer of SiOx is evaporated over the row-patterned substrate prior to the application of the mylar dielectric. This layer shields the indium oxide during the ion-beam milling process and is subsequently removed by plasma etching. A sample cell for evaluation by ISI was delivered in January. It is anticipated that the yield of mylar EPID cells will be much higher than that in the past due to the SiOx treatment. A number of cells were fabricated using the photopolymer, technology; the cells performed satisfactorily. Bubbles in the suspension, however, have been a problem with these cells. Several causes are being investigated; the evolution of nitrogen gas and poor sealing may be the major contributing causes. Solutions to these problems are being investigated. Work on fixturing and testing procedures for the Phase II cells has begun. GRA

N82-30531# IBM Research Lab., San Jose, Calif.
THE USE OF HOLOGRAPHY TO INVESTIGATE COMPLEX PHOTOCHEMICAL REACTIONS

D. M. Burland and Chr. Brauchle , Oct. 1981 46 p refs Submitted for publication
(Contract N00014-81-C-0418; NR Proj. 051-782)
(AD-A115378; TR-1) Avail: NTIS HC A03/MF A01 CSCL 07/5

The growth of a hologram can be used to follow the temporal course of a photochemical reaction. In this paper the application of this technique to reactions involving more than one photochemical step is considered. A theoretical framework is developed by which the hologram growth curves can be predicted provided one knows the appropriate kinetic equations. Three different kinetic schemes are explicitly considered; a one-step reaction, two parallel reactions, and a two-step consecutive reaction scheme. The calculations are compared with experimental results obtained for the reaction of benzophenone in polymethylmethacrylate.
Author (GRA)

N82-30532# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN CONSIDERATIONS FOR AN INCOHERENT FIBER OPTIC GYROSCOPE M.S. Thesis

Richard L. Ice Dec. 1981 148 p refs
(AD-A115477; AFIT/GE/EE/81D-29) Avail: NTIS HC A07/MF A01 CSCL 20/6

The components required for the construction of an incoherent fiber optic gyroscope are tested. The instrument uses an incoherent light source such as an LED or diode laser operating below threshold. Five LED's and one laser diode were tested. An acousto-optic modulator is investigated as a signal processing element. Equations are developed showing the effects of incoherence on the minimum expected rotation rate that can be observed. A review of optical rotation sensing in general, and the related technology is presented. The polarization properties of the source and fiber are discussed as they relate to gyro stability and minimum rotation rate. Two possible signal processing techniques are presented which promise to further reduce minimum rotation rate and improve system stability. The requirements on components for the fabrication of an inertial grade gyro are summarized along with a discussion of component contributions to gyro error. Author (GRA)

N82-30533# United Kingdom Atomic Energy Authority, Harwell (England). Nuclear Physics Div.
DESIGN OF A SERVO SYSTEM FOR A MOESSBAUER SPECTROMETER

T. E. Cranshaw Jun. 1981 17 p refs
(DE82-700073; AERE-R-10207) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

The design of a transducer system and servo drive amplifier suitable for Moessbauer spectrometers is described. Particular attention is paid to low and zero frequency drift. Measurements of the loop gain of a practical system are presented. DOE

N82-30534# Hamburg Univ. (West Germany). Inst. fuer Geophysik.
DEVELOPMENT OF A METHOD FOR ROUTINE REGISTRATION OF SHEAR WAVES Final Report, Jan. 1981

Heinz Janle, Alfred Behle, and Johann Sattlegger (Sattlegger Ingenieurbuero fuer Angewandte Geophysik) Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 90 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-062; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19

Key findings in regards to routine recording of S waves, and especially of converted waves (PS waves), are reported. The application of PS waves is related to the possibility of recording these waves parallel with routine seismic data gathering. The identification of PS waves is achieved first through their direction of oscillation (polarization), secondly through analysis of their velocities in common offset plane sections. More sophisticated and automated methods of P wave/PS wave correlation are discussed. For further studies of S events, and for the interpolation of measurements with three-component geophones, synthetic seismograms of two-dimensional models can be used. The seismograms are calculated by the reflectivity method as well as by ray tracing. Author (ESA)

N82-30535# Fraunhofer-Inst. fuer Informations- und Datenverarbeitung, Karlsruhe (West Germany).
STANDARD METHODS OF IMAGE PROCESSING. PART 2: DESCRIPTION AND THEORETICAL EVALUATION OF SERIES EXPANSIONS [STANDARDMETHODEN DER BILDVERARBEITUNG. TEIL 2: BESCHREIBUNG UND THEORETISCHE BEWERTUNG VON REIHENENTWICKLUNGEN]

Willi Haettich and Gottfried Winkler 1982 107 p refs In GERMAN; ENGLISH summary
(BMVg-FBWT-82-1) Avail: NTIS HC A06/MF A01

Image processes are reviewed and grouped according to similarities. Series expansions of an image are obtained by image transformations where the coefficients of the series correspond to pixels of the transformed image. Each of the transformations is defined, citing its most important features, an estimation of computing effort, and possible applications. Some transformations are specifications of a general class of transformation. Almost no specific military applications were found in the surveys. Experimental performance tests are the only method for judging the performance of a given transformation. The dependence of a transformation on variations in physical influences, such as perspective degree of distortion, size of objects, presence of shadows, brightness of a scene, and sensor parameters, can only be determined experimentally. Author (ESA)

N82-30536# Technical Univ. of Denmark, Lyngby. Inst. of Electromagnetics.
FEASIBILITY STUDY ON TOTAL POWER RADIOMETERS: CALIBRATION ACCURACY AND SENSITIVITY OF DIFFERENT RADIOMETER TYPES. EXECUTIVE SUMMARY

Niels Skou Paris ESA Nov. 1981 17 p refs
(Contract ESA-4479/80/F-DD(SC))
(R-247; ESA-CR(P)-1575) Avail: NTIS HC A02/MF A01

The need for the Dicke principle of introducing a rapidly

switching radiometer, given the high quality of modern amplifiers, was studied experimentally. The hypothesis that gain fluctuations are slow enough to be corrected by the calibration procedure was also tested. Dicke and other radiometers underwent standard performance tests. Results show that total power radiometer sensitivity can be greater by a factor of 1.3 to that of a Dicke radiometer. The noise injection radiometer is the most accurate, but the total power radiometer has weight and volume advantages and is compatible with microstrip techniques. Author (ESA)

N82-30537# British Aerospace Dynamics Group, Stevenage (England). Space and Communications Div.
FINE ATTITUDE MEASUREMENT SYSTEM STUDY Final Report
A. G. Cross and M. Burton Paris ESA Nov. 1981 88 p refs
(Contract ESA-4230/80/NL-PP(SC))
(BAe-TPD-7933; ESA-CR(P)-1579) Avail: NTIS HC A05/MF A01

Performance analyses for 18 sensor configurations were performed, and electrical and mechanical interfaces were examined. The effects of thermal distortions between star sensors and gyroscopes were assessed. These indicate that star mappers are preferable to star trackers. The TNO-TPD catadioptric star mapper is advocated. Author (ESA)

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-30538*# Princeton Univ., N. J. Dept. of Physics.
MASER RADIOMETER FOR COSMIC BACKGROUND RADIATION ANISOTROPY MEASUREMENTS Final Report
Dale J. Fixsen and David T. Wilkinson Jun. 1982 13 p
(Contract JPL-956292)
(NASA-CR-169212; JPL-9950-696; NAS 1.26:169212) Avail: NTIS HC A02/MF A01 CSCL 20E

A maser amplifier was incorporated into a low noise radiometer designed to measure large-scale anisotropy in the 3 deg K microwave background radiation. To minimize emission by atmospheric water vapor and oxygen, the radiometer is flown in a small balloon to an altitude to 25 km. Three successful flights were made - two from Palestine, Texas and one from Sao Jose dos Campos, Brazil. Good sky coverage is important to the experiment. Data from the Northern Hemisphere flights has been edited and calibrated. B.W.

N82-30539*# National Aeronautics and Space Administration, Washington, D. C.
CONCENTRATION AND TEMPERATURE MEASUREMENTS IN COMBUSTION MEASUREMENTS USING COHERENT ANTISTOKES RAMAN SCATTERING (CARS) SPECTROSCOPY
C. Malvicini Jul. 1982 16 p refs Transl. into ENGLISH of "Misure di Concentrazioni e Temperature in Atmosfere di Combustione Mediante Spettroscopia CARS" Rept. CISE-1647 Milan, 1980 16 p Presented at the 2nd Natl. Congr. on Quantum and Plasma Electron., Palermo, Italy, 20-22 May 1980 Translation was announced as N81-24441 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Centro Informazioni Studi Esperienze, Milan
(Contract NASw-3542)
(NASA-TM-76936; NAS 1.15:76936; CISE-1647) Avail: NTIS HC A02/MF A01 CSCL 20E

The theory underlying the coherent antistokes Raman scattering (CARS) process is reviewed and the experimental arrangement required to record the spectra of CO, CO2, H2O, N2, and O2 in cells heated to 1800 K is described. The antistokes signal is analyzed spectrally with a monochromator. Combining with this instrument a vidicon or an array of photodiodes, the entire rotovibrational spectrum of a molecular species is obtained with a single laser shot. M.G.

N82-30540# New Mexico State Univ., Las Cruces. Dept. of Electrical and Computer Engineering.
OPTIMAL CONTROL OF THE HEL BEAM Final Report, 1 Feb. 1981 - Jan. 1982
J. Eldon Steelman Feb. 1982 23 p refs
(Grant AF-AFOSR-81-0081; AF Proj. 2301)
(AD-A114927; AFOSR-82-0387TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

Optimal control of the deformable mirror in a High Energy Laser was used to reduce the effects of atmospheric turbulence. The performance characteristics of an optical detector with one or four sub-apertures were estimated. These estimated performance characteristics were then used to determine the regime where four sub-apertures gave better performance than one sub-aperture for no time delay and for a one millisecond delay. Author (GRA)

N82-30541# Naval Postgraduate School, Monterey, Calif.
A COMPUTER PROGRAM FOR INVESTIGATING ATMOSPHERIC EFFECTS ON LASER DESIGNATORS M.S. Thesis
Scott R. Crager Mar. 1982 66 p refs
(AD-A114490) Avail: NTIS HC A04/MF A01 CSCL 17/8

This thesis presents a computer program designed to analyze the data from a TV camera for investigating laser beam propagation through the atmosphere. It uses aspects of Fourier optical theory to analyze the TV image to measure the effects of atmospheric disturbance and platform stability on the target spot. The understanding and analysis of these effects are increasingly important as lasers and other optical devices experience increased use in military application. Author (GRA)

N82-30542# Smithsonian Astrophysical Observatory, Cambridge, Mass.
STUDY OF CRYOGENIC TECHNIQUES FOR OPERATING HYDROGEN LASERS Interim Report, 1 May 1981 - 31 Mar. 1982
Robert F. C. Vessot Mar. 1982 33 p refs
(Contract N00014-77-C-0777)
(AD-A114933) Avail: NTIS HC A03/MF A01 CSCL 20/5

Cryogenic Techniques are applied to the Atomic Hydrogen Maser Frequency Standard to extend the storage time of the atoms and reduce the thermal noise accompanying the signal and within the resonance linewidth. One maser system is completed and installed in the cryostat. The wall coating gas handling system and the pulse and cavity measuring systems are now available for testing. A new cold dissociator has been built, tested and installed on the maser. In addition, two electronic control systems have been completed. Additional tests will be conducted. Stability at the 1x10 to the -16th power level in delta f/f for averaging time intervals of 1,000 seconds is expected at temperatures below 30 K. Author (GRA)

N82-30543# Electronics Research Lab., Adelaide (Australia).
MONTE CARLO SIMULATION OF LASER BACKSCATTER FROM SEA WATER
B. W. Koerber and D. M. Phillips Jan. 1982 30 p refs
(AD-A115410; ERL-0224-TR; AR-002-811) Avail: NTIS HC A03/MF A01 CSCL 12/1

A Monte Carlo simulation study of laser backscatter from sea water has been carried out to provide data required to assess the feasibility of measuring inherent optical propagation properties of sea water from an aircraft. The possibility was examined of deriving such information from the backscatter component of the return signals measured by the WRELADS laser airborne depth sounder system. Computations were made for various water turbidity conditions and for different fields of view of the WRELADS receiver. Using a simple model fitted to the computed backscatter data, it was shown that values of the scattering data absorption coefficients can be derived from the initial amplitude and the decay rate of the backscatter envelope. Author (GRA)

N82-30544# California Univ., Santa Barbara. Quantum Inst.
THEORY OF PULSE PROPAGATION AND COHERENCE IN FREE ELECTRON LASERS Annual Scientific Report
W. B. Colson 1982 10 p
(Grant AF-AFOSR-0061-81; AF Proj. 2301)
(AD-A115246; AFOSR-82-0384TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

Pulse propagation in several free electron laser designs is

examined along with mode instabilities, oscillator evolution, spontaneous emission, transverse wavefront propagation, and Coulomb forces. The designs explored include the simple undulator, the tapered undulator, the optical klystron, and the transverse gradient gain-expansion magnet. Author (GRA)

N82-30545# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

LASER INDUCED FLUORESCENCE OF BARIUM EVAPORATING FROM A DISPENSER CATHODE M.S. Thesis

Stephen Michael Zemyan Mar. 1982 66 p refs

(AD-A115534; AFIT/GNE/PH/82M-13) Avail: NTIS HC A04/MF A01 CSCL 09/1

A continuous wave dye laser is used to induce resonance fluorescence in Ba atoms evaporating from a thermionic dispenser cathode. The laser is tuned to the 553.5 microns Ba I line by making use of the optogalvanic effect in a hollow cathode discharge tube. Photon counting equipment is used to measure the Ba fluorescent intensity as a function of cathode temperature and laser power. Ba concentrations and evaporation rates as functions of temperature are derived from the fluorescent intensity. Laser induced fluorescence is established as a technique for examining various species evaporating from cathodes. The technique can be used in attempts to determine cathode failure mechanisms. Author (GRA)

N82-30546# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

RADIATION SPECTRUM OF RELATIVISTIC ELECTRONS IN A SPATIALLY PERIODIC TRANSVERSE MAGNETIC FIELD

Runwen Wang and Shizhan Lei 13 May 1982 13 p refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 8, Aug. 1981 p 1-4

(AD-A115265; FTD-ID(RS)T-0244-82) Avail: NTIS HC A02/MF A01 CSCL 20/3

The motion track of relativistic electrons in a spatially periodic transverse magnetic field were analyzed. Under some conditions, the electron motion is harmonic in the direction perpendicular to the original incident one. Radiation spectrum and spectral width were obtained using harmonic mode. Nonharmonic mode is also discussed. The results show that the distribution of the radiation spectrum depends on the initial electron velocity and the intensity of the magnetic field. GRA

N82-30547# Naval Postgraduate School, Monterey, Calif.

FLOW CONTROL FOR A HIGH ENERGY LASER TURRET USING TRAPPED VORTICES M.S. Thesis

James Edward Burd Dec. 1981 101 p refs

(AD-A115263; NPS67-81-017) Avail: NTIS HC A06/MF A01 CSCL 20/5

The Department of Defense is concerned with the viability of an airborne high energy laser system. The laser is housed in a blunt turret atop a NKC-135 aircraft. Turbulence generated by flow separation around the turret causes optical distortion of the laser beam. Control of flow separation is needed to improve laser beam performance especially for aft-aimed turrets. One technique proposed for flow control is a fairing design which will stabilize shed vortices by suction. A two dimensional computer model was used to design a fairing compatible with present test equipment. Experimental research of this fairing design was conducted in wind tunnel tests. Although flow mapping demonstrated improved flow performance through the use of suction, total quiescent flow was never achieved. A more adequate three dimensional model is needed to design a fairing that will stabilize trapped vortices. GRA

N82-30548# Lincoln Lab., Mass. Inst. of Tech., Lexington.

WORKSHOP ON THE INTERACTION OF LASER RADIATION WITH SURFACES FOR APPLICATION TO MICROELECTRONICS Final Report, 1 May - 31 Oct. 1981

Richard Osgood 31 Oct. 1981 29 p Workshop held in Cambridge, Mass., 4-5 May 1981

(Grant AF-AFOSR-0181-81; AF Proj. 2301)

(AD-A115146; AFOSR-82-0430TR) Avail: NTIS HC A03/MF A01 CSCL 20/5

A workshop was held which was devoted to the physics and chemistry of new optical processing and analysis techniques on surfaces for materials and structures of interest in microelectronics. It contained tutorial papers on topics of general interest to this technical area and reviewed progress in ongoing research. In addition, selected short talks describing recent results were presented. The workshop included talks from various groups throughout the United States and Europe. GRA

N82-30549# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Electrical Engineering.

ALTERNATIVE DYNAMICS MODELS AND MULTIPLE MODEL FILTERING FOR A SHORT RANGER TRACKER M.S. Thesis

Patrick M. Flynn Dec. 1981 160 p refs

(AD-A115503; AFIT/GE/EE/81D-21) Avail: NTIS HC A08/MF A01 CSCL 17/8

The performance of three extended Kalman filter implementations that estimate target position, velocity, and acceleration states for a laser weapon system are compared using various target acceleration trajectories. Measurements available to the extended Kalman filters each update are taken directly from the outputs of a forward looking infrared (FLIR) sensor. Two dynamics models considered for incorporation into the filter are (1) a Brownian motion (BM) acceleration model and (2) a constant turn rate (CTR) target dynamics model. The CTR filter was compared against the BM filter to see if the more complex dynamics of the CTR filter gave it a significant improvement in tracking performance over the BM filter. These two simple extended Kalman filters were then compared to a multiple model adaptive filter consisting of a bank of three filters based on the Brownian motion acceleration model. All three filters are tested using three different flight trajectory simulations: a 2 g, a 10 g and a 20 g pull-up maneuver. All evaluations are accomplished using Monte Carlo simulation techniques. The constant turn rate extended Kalman filter was found to outperform the other two filters. The main advantage this filter had was the minimization of mean bias error in estimating position. The standard deviation of error was also slightly lower in most instances. Author (GRA)

N82-30550# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

DIRECT INVESTIGATION OF HYDROCHLORIDE ELIMINATION FROM 1,2-DICHLORETHANE BY LASER INDUCED RADICAL CHAIN REACTIONS Thesis [DIREKTE UNTERSUCHUNG DER CHLORUWASSERSTOFFELIMINIERUNG AUS 1,2-DICHLORETHAN DURCH LASERINDUZIERTE RADIKALKETTENREAKTIONEN]

Matthias Schneider Dec. 1981 66 p refs In GERMAN

(MPIS-21/1981; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 12.90

The radical chain reaction elimination of hydrochloride from 1,2-dichlorethane was investigated in a flow reactor at a temperature from 520 to 720 K and a pressure from 60 to 600 Torr. The chain reaction was induced by KrF laser photolysis of the dichlorethane. The temperature dependence of the UV absorption spectra of dichlorethane and the products vinyl chloride and hydrochloride were measured in the range from 300 to 770 K. The time resolved product formation after the laser pulse is obtained by UV absorption measurements. From the measured signals the reaction time constant K3 is obtained for the unimolecular decay of the 1,2-dichlorethane radical. It determines the chain reaction time and is clearly pressure dependent between 60 and 600 Torr. The quantum yield was determined in a flow reactor as well as in a static cell. It is inversely proportional to the square root of the initial radical concentration. System kinetics were simulated in a model. Good agreement is found between calculated and measured concentration-time profiles.

Author (ESA)

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-30551*# National Bureau of Standards, Washington, D.C. Thermophysical Properties Div.

THERMOELECTRIC REFRIGERATION FOR TEMPERA-

TURES BELOW 100 K: A STUDY OF TITANIUM SESQUIOXIDE

Ray Redebaugh, Del Linenberger, and Elizabeth Spellicy May 1982 14 p refs

(Contract NBS-A-6-3249B(DDA))

(NASA-CR-166343; NAS 1.26:166343; NBSIR-82-1665) Avail: NTIS HC A02/MF A01 CSCL 13H

Previous measurements of the specific heat of V-doped Ti2O3 at low temperatures were explained by a model which also suggested the material would have a high thermoelectric figure-of-merit. The sample preparation, experimental apparatus, and the results of measurements on the thermal conductivity, thermoelectric power, and electrical resistivity of a single crystal Ti2O3 - 4% V sample are described. The results are used to derive the thermoelectric figure-of-merit between 5 and 300 K. The figure-of-merit is much smaller than expected and of little practical value because of the very high phonon thermal conductivity. Author

N82-30552*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

PRECISION OF SPIRAL-BEVEL GEARS

F. L. Litvin (Univ. of Chicago at Chicago Circle), R. N. Goldrich (Univ. of Chicago at Chicago Circle), J. J. Coy, and E. V. Zaretsky 1982 26 p refs Presented at the Winter Ann. Meeting of the Am. Soc. of Mech. Engr., Phoenix, Ariz., 15-19 Nov. 1982 Sponsored in part by AVRADCOM Research and Technology Labs.

(NASA-TM-82888; E-1196; NAS 1.15:82888; AVRADCOM-TR-82-C-11) Avail: NTIS HC A03/MF A01 CSCL 13I

The kinematic errors in spiral bevel gear trains caused by the generation of nonconjugate surfaces, by axial displacements of the gears during assembly, and by eccentricity of the assembled gears were determined. One mathematical model corresponds to the motion of the contact ellipse across the tooth surface, (geometry I) and the other along the tooth surface (geometry II). The following results were obtained: (1) kinematic errors induced by errors of manufacture may be minimized by applying special machine settings, the original error may be reduced by order of magnitude, the procedure is most effective for geometry 2 gears, (2) when trying to adjust the bearing contact pattern between the gear teeth for geometry 1 gears, it is more desirable to shim the gear axially; for geometry II gears, shim the opinion axially; (3) the kinematic accuracy of spiral bevel drives are most sensitive to eccentricities of the gear and less sensitive to eccentricities of the pinion. The precision of mounting accuracy and manufacture are most crucial for the gear, and less so for the pinion. E.A.K.

N82-30553# Royal Military Coll. of Science, Shrivenham (England). Branch of Mechanical Design.

COMPARISON BETWEEN A COMPUTER MODEL AND TRAIL RESULTS FOR A TRACKED VEHICLE RUN OVER RAMPS

D. A. Lloyd Feb. 1981 89 p refs

(TN-MD/TM/6; BR78655) Avail: NTIS HC A05/MF A01

The behavior of a tracked vehicle run over two different ramp profiles at various vehicle speeds was recorded. These results are compared with computer predictions made using the latest mathematical model for the behavior of the vehicle. The computer model is described and the computer program given. The results are discussed and some possible modifications to the model are suggested. J.D.

N82-30554*# Essex Corp., Huntsville, Ala.

FABRICATION OF ESSEX EVA RATCHET WRENCHES Final Report

Charles N. VanValkenburgh and Thomas E. Loughead Jul. 1982 16 p refs

(Contract NAS8-34925)

(NASA-CR-162060; NAS 1.26:162060; H-82-03) Avail: NTIS HC A02/MF A01 CSCL 13I

The extravehicular activity (EVA) ratchet wrench was developed. Shortly after Space Telescope (ST) maintenance simulations began, the need for a specialized maintenance tool arose. With inputs of tool requirements and design recommendations, several development model wrenches were tested in conjunction with ST neutral buoyancy simulations. The wrench design was modified and refined. S.L.

N82-30555# Naval Postgraduate School, Monterey, Calif.

CHARACTERIZATION OF AN HY-130 STEEL WELDMENT BY TRANSMISSION ELECTRON MICROSCOPY M.S. Thesis

Wallace Michael Elger Dec. 1981 86 p

(AD-A114451) Avail: NTIS HC A05/MF A01 CSCL 11/6

A wrought HY-130 steel weldment was studied to provide information about metallurgical differences in the weld heat affected zone (HAZ). Three GMAW welded areas were mapped and analyzed: heavily tempered, moderately tempered and untempered regions. Transverse sections were cut along the weld HAZ and the section microhardness compared with a previous microhardness traverse across the region to determine the location within the HAZ. Transmission electron microscopy revealed the occurrence of significant metallurgical changes from the fusion line to the HAZ/base metal interface. Microstructures were found to be similar to those of a low carbon steel, changing from a fine lath martensite at the HAZ/base metal interface to a mixture of upper bainite and fine lath martensite in the HAZ near the fusion line and finally to lower (acicular) bainite in the weld metal. Author (GRA)

N82-30556# Garrett Turbine Engine Co., Phoenix, Ariz.

GAS FOIL BEARING DEVELOPMENT PROGRAM Final Report, 1 Jul. 1979 - 28 Feb. 1981

Francis J. Suriano Wright-Patterson AFB, Ohio AFWAL Sep. 1981 135 p

(Contract F33615-79-C-2037; AF Proj. 3048)

(AD-A114692; Rept-31-4089; AFWAL-TR-81-2095) Avail: NTIS HC A07/MF A01 CSCL 13/9

This document presents the final technical report for the nineteen-month gas foil bearing development program. The 3.5-inch foil bearing design was analyzed using an elasto-hydrodynamic analysis program. Bearing configurations with 10 and 8 foils were identified as having the potential to exceed the performance of the 12-foil GTCP165 APU bearing. A total of six bearing configurations were tested, two ambient temperature configurations using Teflon-S coated foils with a chrome-plated journal, and four with high-temperature foil and journal coatings. The high-temperature bearings used foil coatings Kaman DES, Kaman DES + au, Co-20 Ni, and TiC, all of which were run with a Kaman SCA-coated journal. Program goals were met with both ambient-temperature bearing configurations and Kaman SCA versus Kaman DES and TiC high-temperature configurations. GRA

N82-30557# SKF Industries, Inc., King of Prussia, Pa.

SOLID LUBRICATED SILICON NITRIDE BEARINGS AT HIGH SPEED AND TEMPERATURE Final Report, Sep. 1980 - Oct. 1981

T. M. Yonushonis Feb. 1982 81 p refs

(Contract N00019-80-C-0565)

(AD-A114848; SKF-AT82D002) Avail: NTIS HC A05/MF A01 CSCL 13/9

Functional evaluations of solid lubricated 7205 bearings were conducted over the speed range, 10,000 rpm (1050 rad/sec) to 55,000 rpm (5760 rad/sec), using an air turbine drive system. The 7205 bearings were comprised of silicon nitride balls, M50 steel rings, and graphite containing cages. Graphite films transferred from the cage to the ball surfaces, then to the groove surfaces were the only source of lubrication. Liquid lubrication was not supplied to the test bearings. Inspection of the bearing components after the tests was very encouraging. The graphite films transferred to the silicon nitride balls and M50 steel grooves were effective in preventing wear of the bearing surfaces. The cage pocket wear and wear of graphite piloting surfaces were considered acceptable. Optical microscopy of etched M50 ring cross sections revealed that limited plastic deformation has occurred during the tests. Plastic deformation of the inner ring groove surface was believed to be significant, since plastic deformation would result in a higher heat generation at the inner ring surface contributing to bearing seizure. The silicon nitride balls did not exhibit any evidence of plastic deformation. GRA

N82-30558# Aerodyne Dallas, Tex.
TURBOCHARGING OF SMALL INTERNAL COMBUSTION ENGINE AS A MEANS OF IMPROVING ENGINE/APPLICATION SYSTEM FUEL ECONOMY-FURTHER TURBOCHARGER IMPROVEMENTS Final Report, Oct. 1980 - Feb. 1982
John R. Arvin Apr. 1982 80 p refs
(Contracts DAAK70-80-C-0146; DAAK70-78-C-0031)
(AD-A115073) Avail: NTIS HC A05/MF A01 CSCL 21/7

Improvements to a small diesel engine turbocharger were made based on data gathered during a previous Army contract. The improved turbocharger was fabricated and tested on a small, four cylinder, 239 CID diesel engine. Engine dynamometer test data revealed a 2 to 9 percent reduction in fuel consumption at all points over the operating envelope. A turbocharger was operated for 1011 hours at speeds between 70000 and 78000 rpm without incident. The ball bearings were in excellent condition at the end of the test. A math model of the engine and turbocharger was generated. The model was used to estimate 13 Mode Federal Diesel Emissions Cycle, the LA4 driving cycle and the application of the variable area turbine nozzle (VATN) turbocharger to a diesel engine driven generator set. A recommendation was made to build a gen set demo unit. A fuel savings of 8 to 10 percent was estimated for a 30 kW DED generator set. Author (GRA)

N82-30559# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
DESIGN AND ANALYSIS TOOL VALIDATION
Ron Judkoff Jul. 1981 5 p refs Presented at the DOE Passive and Hybrid Solar Energy Program Update, Washington, D.C., 9-12 Aug. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-001543; SERI/TP-721-1327; CONF-810832-7) Avail: NTIS HC A02/MF A01

A procedure for the validation of building energy analysis simulation codes (BEAS) is developed. These codes are being used increasingly in the building design process, both directly and as the basis for simplified design tools and guidelines. The importance of the validity of the BEAS in predicting building energy performance is obvious when one considers the money and energy that could be wasted by energy-inefficient design. Little or no systematic effort was made to ensure the validity of the various BEAS. The validation work consists of three distinct parts: comparative study, analytical verification, and empirical validation. The procedures were developed for the first two parts and were implemented on a sampling of the major BEAS; results show major problems in one of the BEAS tested. DOE

N82-30560# Electric Power Research Inst., Palo Alto, Calif.
WORKSHOP PROCEEDINGS: ROTOR FORGINGS FOR TURBINES AND GENERATORS
R. I. Jaffee, ed. Sep. 1981 767 p refs Workshop held at Palo Alto, Calif., 14-17 Sep. 1980
(DE81-904198; EPRI-WS-79-235; CONF-8009174) Avail: NTIS HC A99/MF A01

Data for the period from 1950 to 1980 are presented on failures of large steam turbine rotors, both low and intermediate pressure in power plants. While the emphasis was on rotors, a few disc failures deemed relevant have been examined. The various failures are classified as follows: brittle failure; creep-rupture; equipment-caused failure; operator-induced; stress corrosion cracking and corrosion fatigue; fatigue (plus temper embrittlement); disc failure which led to rotor failure; and disc failure of potential consequence to rotor failure. Brittle failures should no longer be a problem. Metallurgical problems such as inadequate creep-rupture properties, temper embrittlement and inadequate resistance to corrosion-fatigue are recognized but still exist. DOE

N82-30561# SRI International Corp., Menlo Park, Calif.
FRICTION MEASUREMENTS OF STEEL ON REFRACTORY BRICKS Final Report, Aug. 1981
L. E. Eiselstein Aug. 1981 42 p refs
(EPRI Proj. 1704-17)
(DE82-900328; EPRI-NP-1987) Avail: NTIS HC A03/MF A01

During startup or shutdown of a pool type LMFBR, substantial shear stresses arise between the base of the steel reactor vessel and the refractory brick support base. The magnitude of these stresses, which result from differences in thermal expansion, are estimated if the friction coefficient is known. Experiments to determine friction coefficients between 2 1/4 Cr-1Mo steel and several refractory materials and to examine effects to contact pressure, temprature sliding velocity, lubricants, and surface condition are described. DOE

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-30562# Wisconsin Univ., Madison. Mathematics Research Center.
RECENT ADVANCES IN STATISTICAL METHODS FOR SYSTEM RELIABILITY USING BERNOULLI SAMPLING OF COMPONENTS
Bernard Harris and Andrew P. Soms Dec. 1981 24 p refs
(Contracts DAAG29-80-C-0041; N00014-79-C-0321)
(AD-A114495; MRC-TSR-2312) Avail: NTIS HC A02/MF A01 CSCL 12/1

The paper provides a survey of results in statistical inference in systems reliability using Bernoulli sampling of individual components. Particular attention is given to the notion of Buehler optimality and its implementation in such problems. Recent results of the authors on Buehler optimal confidence bounds on the reliability of series and parallel systems are discussed. For series systems, these results employ a generalization of an inequality of Sudakov. For parallel systems, Buehler optimal bounds are obtained for small numbers of failures using the notion of Schur concavity. Estimates of the optimal bounds are obtained in those cases for which the property of Schur concavity does not hold. Author (GRA)

N82-30563# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SEQUENTIAL TESTING OF HYPOTHESES CONCERNING THE RELIABILITY OF A SYSTEM MODELED BY A TWO-PARAMETER WEIBULL DISTRIBUTION M.S. Thesis
Philippe A. Lussier Dec. 1981 55 p refs
(AD-A115542; AFIT/GOR/MA/81D-8) Avail: NTIS HC A04/MF A01 CSCL 12/1

Monte Carlo Analysis techniques are used for the development of test plans concerning hypothesized system reliabilities. Systems under consideration are those in which component failure rates are best described by the two-parameter Weibull probability density function. The statistical test employed is Wald's sequential probability radio test using independent, asymptotically computed variances (Cramer-Rao Lower Bound Technique). The null hypothesis, HO: HO: RO = .90, is tested against alternative reliabilities of .854, .810, and .729. Three pairs of alpha and beta risk levels are considered for each test ((.1,.1), (.2,.2), (.1,.2). A truncation decision for the sequential test is made at 1.5 times the fixed sample test size for the same conditions. One thousand Monte Carlo repetitions are used for these test procedures. Author (GRA)

N82-30564# Sandia Labs., Albuquerque, N. Mex.
SYSTEMIC-EVENT TREE METHODOLOGY EMPLOYED IN THE INTERIM RELIABILITY EVALUATION PROGRAM (IREP)
G. J. Kolb 1981 21 p Presented at the ANS/ENS Topical Meeting on Probabilistic Risk Assessment, Port Chester, N.Y., 20 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030719; SAND-81-2073C; CONF-810905-19) Avail: NTIS HC A02/MF A01

The systemic event tree*methodology employed in the IREP is summarized. The analysis steps required to construct a set of event trees which model core meltdown accident sequences initiated by a variety of LOCA and transient initiating events are discussed. Analysis of the emergency procedures the plant

operators follow during a given accident sequence is also discussed. DOE

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N82-30565*# Standard Pressed Steel Co., Jenkintown, Pa.
TORQUE VS. INDUCED LOAD OF A-286, AND MP35N NUTS AND BOLTS WITH CADMIUM, DRY FILM, AND CETYL ALCOHOL LUBRICANTS Final Report
Corey Crispell 14 Nov. 1978 61 p
(Contract NAS8-32525)
(NASA-CR-162046; NAS 1.26:162046; Rept-5920) Avail: NTIS HC A04/MF A01 CSCL 20K

Data for specific joint design, utilizing various combinations of bolt, nut and lubricants in typical structure of the shuttle booster rocket is obtained. Requirements of the structure performance criteria were to withstand temperatures of 260 C (500 F) and to provide a nut lubricant which would be compatible with sealants used in the joint. Cadmium plating and dry film lubricant meeting the requirements of MIL-L-8937 were the lubricants specified. In a follow up effort, cadmium plating and cetyl alcohol were further specified The materials for the bolt and nut combinations were MP35N and A-286. These materials demand a lubricant to be used to prevent galling of the thread when tightened and also to help reduce the scatter of clamping load in application. S.L.

N82-30566*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STRUCTURES AND DYNAMICS DIVISION RESEARCH AND TECHNOLOGY PLANS, FY 1982
Kay S. Bales Jun. 1982 56 p
(NASA-TM-84509; NAS 1.15:84509) Avail: NTIS HC A04/MF A01 CSCL 20K

Computational devices to improve efficiency for structural calculations are assessed. The potential of large arrays of microprocessors operating in parallel for finite element analysis is defined, and the impact of specialized computer hardware on static, dynamic, thermal analysis in the optimization of structural analysis and design calculations is determined. General aviation aircraft crashworthiness and occupant survivability is also considered. Mechanics technology required for design coefficient, fault tolerant advanced composite aircraft components subject to combined loads, impact, postbuckling effects and local discontinuities are developed. S.L.

N82-30567*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE ROLE OF PEEL STRESSES IN CYCLIC DEBONDING
Richard A. Everett, Jr. Jun. 1982 21 p refs
(NASA-TM-84504) Avail: NTIS HC A02/MF A01 CSCL 20K

When an adhesively bonded joint is undergoing cyclic loading, one of the possible damage modes that occurs is called cyclic debonding - progressive separation of the adherends by failure of the adhesive bond under cyclic loading. In most practical structures, both peel and shear stresses exist in the adhesive bonding during cyclic loading. The results of an experimental and analytical study to determine the role of peel stresses on cyclic debonding in a mixed mode specimen are presented. Experimentally, this was done by controlling the forces that create the peel stresses by applying a clamping force to oppose the peel stresses. Cracked lap shear joints were chosen for this study. A finite element analysis was developed to assess the effect of the clamping force on the strain energy release rates due to shear and peel stresses. The results imply that the peel stress is the principal stress causing cyclic debonding. Author

N82-30568*# Kentron Technical Center, Hampton, Va. Technical Center.
TENSILE STRESS-STRAIN BEHAVIOR OF GRAPHITE/EPOXY LAMINATES
D. P. Garber Aug. 1982 99 p refs
(Contract NAS1-16000)
(NASA-CR-3592; NAS 1.26:3592) Avail: NTIS HC A05/MF A01 CSCL 20K

The tensile stress-strain behavior of a variety of graphite/epoxy laminates was examined. Longitudinal and transverse specimens from eleven different layups were monotonically loaded in tension to failure. Ultimate strength, ultimate strain, and stress-strain curves were obtained from four replicate tests in each case. Polynominal equations were fitted by the method of least squares to the stress-strain data to determine average curves. Values of Young's modulus and Poisson's ratio, derived from polynomial coefficients, were compared with laminate analysis results. While the polynomials appeared to accurately fit the stress-strain data in most cases, the use of polynomial coefficients to calculate elastic moduli appeared to be of questionable value in cases involving sharp changes in the slope of the stress-strain data extensive scatter. Author

N82-30569# Royal Military Coll. of Science, Shrivenham (England). Dept. of Civil Engineering.
STRUCTURALLY EQUIVALENT MATERIALS COMPARISON
M. J. Iremonger and N. F. A. Heydon Aug. 1980 46 p refs
(TN-MAT/29; BR78654) Avail: NTIS HC A03/MF A01

When selecting materials for load-bearing functions it is important that they are compared on a basis of structural equivalence. A method for obtaining relative thicknesses, masses and material costs of uniform bars, beams and panels is described. A BASIC program is presented which performs these comparisons for beams of equivalent strength and equivalent stiffness in both tension and bending. Thirty eight materials including thirty three plastics are compared for short loading at 20 C and ten plastics are compared for both short (100 second) and long term (1000 hour) loading at both 20 C and 60 C. The limitation of these comparisons are discussed with particular reference to the quality of data and the validity of the structural equivalence model. S.L.

N82-30570 National Physical Lab., Teddington (England). Div. of Materials Applications.
DETERMINATION OF THE STRAIN DISTRIBUTION IN A CIRCULAR PLATE UNDER UNIFORM PRESSURE FOR BIAXIAL STRESS TESTS
G. Dean, C. Forno, A. Johnson, and D. Dawson Apr. 1982 36 p refs
(NPL-DMA(A)-42; ISSN-0143-7313) Avail: NTIS HC A03/MF A01

An apparatus which generates a biaxial stress at the surface of a plastics test piece in the form of a circular plate is described. A theory for the calculation of strain distribution where the deflection of the center of the plate is comparable with its thickness is developed. Theoretical predictions are compared with strain values determined by a Moire fringe method and using strain gages. Two plates of different thickness, loaded to pressure levels which produce similar maximum strains in the two plates, but different deflection to thickness ratios (DTR) are compared. Author (ESA)

N82-30571# Notre Dame Univ., Ind. Dept. of Civil Engineering.
A VISCOPLASTIC ALGORITHM FOR CAP75 Final Report, Sep. 1980 - Sep. 1981
Michael G. Katona and Mark A. Mulert May 1982 66 p refs
(Contract N68305-80-C-0031; ZR000011I30)
(AD-A114460; CEL-CR-82.021) Avail: NTIS HC A04/MF A01 CSCL 09/2

A viscoplastic formulation based on Perzyna's elastic/viscoplastic theory is developed for geological materials using the Sandler and Rubin CAP75 plasticity model. The numerical strategy employs a one parameter Crank-Nicolson time integration scheme which provides options for explicit and implicit algorithms. A computer program called VPDRVR exercises these algorithms for arbitrary states of stress or strain. Author (GRA)

N82-30572# Naval Postgraduate School, Monterey, Calif.
SHAPE OPTIMIZATION OF TRUSSES SUBJECT TO STRENGTH, DISPLACEMENT AND FREQUENCY CONSTRAINTS M.S. Thesis
Jorge E. Felix Dec. 1981 73 p refs
(AD-A114450) Avail: NTIS HC A04/MF A01 CSCL 13/13

Three dimensional trusses are designed for minimum weight, subject to constraints on: member stresses, Euler buckling, joint displacements and system natural frequencies. Multiple static load conditions are considered. The finite element displacement method of analysis is used and eigenvalues are calculated using the subspace iteration technique. All gradient information is calculated analytically. The design problem is cast as a multi-level numerical optimization problem. The joint coordinates are treated as system variables. For each proposed configuration, the member sizes are updated as a sub-optimization problem. This sub-problem is efficiently solved using approximation concepts in the reciprocal variable space. The multi-level approach is shown to be an effective technique which conveniently takes advantage of the most efficient methods available for the member sizing problem. Examples are presented to demonstrate the method. The optimum configuration is shown to be strongly dependent on the constraints which are imposed on the design.
Author (GRA)

N82-30573# Orlando Technology, Inc., Shalimar, Fla.
THE EFFECT OF MATERIAL PROPERTIES ON THE DEFORMATION OF RODS STRETCHING UNDER LARGE VELOCITY GRADIENTS Final Report
John J. Osborn Eglin AFB, Fla. AFATL Sep. 1981 87 p refs
(Contract F08635-81-C-0131; AF Proj. 2502)
(AD-A114889; AFATL-TR-81-81) Avail: NTIS HC A05/MF A01 CSCL 11/6

This report presents analytical solutions for the velocity and position of necks in a rod stretching under large velocity gradients. Solutions are based on assuming various forms for the yield strength of the rod. The model predicts many phenomena seen in stretching shaped charge jets without recourse to probalistic perturbations.
Author (GRA)

N82-30574# SRI International Corp., Menlo Park, Calif.
DYNAMIC ELASTIC-PLASTIC RESPONSE OF BEAMS IN COMBINED THRUST AND BENDING Final Report, 16 Oct. 1979 - 15 Oct. 1981
J. D. Colton, J. L. Dein, and A. L. Florence 15 May 1982 31 p refs
(Contract DAAG29-79-C-0219)
(AD-A115267; ARO-15400.1-EG) Avail: NTIS HC A03/MF A01 CSCL 13/3

A one-dimensional structural mechanics model is presented for analyzing the elastic-plastic response of rods to slightly inclined end thrusts. The theory is kept simple by restricting the development to cases in which the axial thrust dominates, the bending moment being considered as a perturbation that may grow. Partial unloading of a cross section caused by excessive bending is included in the treatment but requires further numerical study. Solutions are obtained using the method of characteristics. The computer code describing the elastic-plastic wave propagation is simple and may be useful for preliminary design of rod penetrators.
GRA

N82-30575# Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
STRETCH FORMING AND FRACTURE OF STRONGLY TEXTURED Ti ALLOY SHEET
K. S. Chan (Stanford Univ., Calif.) and D. A. Koss Mar. 1982 23 p refs
(Contract N00015-76-C-0037; NR Proj. 031-756)
(AD-A115385; TR-18) Avail: NTIS HC A02/MF A01 CSCL 11/6

The influence of plastic anisotropy and R-value on the stretch forming and fracture behavior of strongly textured Ti-6Al-4V and Ti-5Al-2.5Sn sheet has been examined utilizing sheet specimens with a wide range of R-values but with similar work hardening and strain rate sensitivity characteristics. The results indicate that a high R-value and difficult through-thickness slip enhance the forming limit as well as fracture strains when the minor strain in the plane of the sheet is negative, this effect being most pronounced at uniaxial tension. At plane strain, the R-value has little or no influence on the limit or fracture strain. A direct determination of the effect of R-value on the biaxial strecth forming characteristics of Ti-6Al-4V sheet is precluded by the intervention of fracture prior to localized necking when the minor strain is positive. The influence of plastic anisotrophy on both the localized necking and the fracture behavior can be generally understood in terms of difficulty of attaining critical thickness strains as through-thickness slip becomes more difficult.
Author (GRA)

N82-30576# Minnesota Univ., Minneapolis. Dept. of Aerospace Engineering and Mechanics.
STRUCTURAL INELASTICITY, 28 Final Report
Philip G. Hodge, Jr., Patrick Tait, and James Malone Mar. 1982 71 p refs
(Contract N00014-75-C-0177; NR Proj. 644-429)
(AD-A115101; AEM-H1-28) Avail: NTIS HC A04/MF A01 CSCL 13/13

A summary and bibliography are presented of the investigations of structural inelasticity which were carried out at the University of Minnesota under the sponsorship of the Office of Naval Research during the period 1971-1981. Also included are preliminary reports on two investigations still in progress.
Author (GRA)

N82-30577# Los Alamos Scientific Lab., N. Mex. Energy Div.
CONTAINMENT BUCKLING PROGRAM
C. A. Anderson and J. G. Bennett 1981 9 p ref Presented at the 9th Water Reactor Safety Res. Inform. Meeting, Washington, D.C., 26-28 Oct. 1981
(Contract W-7405-eng-36)
(DE82-000568; LA-UR-81-2775) Avail: NTIS HC A02/MF A01

Investigations underway to evaluate the adequacy of current design procedures for free standing steel nuclear containment shells having static and dynamic structural stability are described. Tests of steel cylinders imulating one-sixtieth actual size containment shells are described. It was demonstrated that fabrication imperfections dominate the buckling failure of steel cylinders. Ring reinforced cylinder tests being performed to provide benchmark computer code buckling prediction capacity are described in detail.
DOE

N82-30578# Sandia Labs., Albuquerque, N. Mex.
APPROACH TO THE FATIGUE ANALYSIS OF VERTICAL-AXIS WIND-TURBINE BLADES
Paul S. Veers 1981 33 p refs Presented at the 5th Biennial Wind Energy Conf. and Workshop, Washington, 5 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE82-000260; SAND-81-1949; CONF-811043-2) Avail: NTIS HC A03/MF A01

An analysis of the stress history of wind turbine blades indicates that a single stress level at each wind speed does not adequately describe the blade stress history. A statistical description is required. Blade stress data collected from experimental turbines indicate that the Rayleigh probability density function adequately describes the distribution of vibratory stresses at each wind speed. The Rayleigh probability density function allows the distribution of vibratory stresses to be described by the RMS of the stress vs. time signal. With the RMS stress level described for all wind speeds, the complte stress history of the turbine blades is known. Miner's linear cumulative damage rule is used as a basis for summing the fatigue damage over all operating conditions. An analytical expression is derived to predict blade fatigue life.
DOE

N82-30579# Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Hamburg (West Germany). Forschungszentrum.
METHODS FOR INVESTIGATION OF CRACK PROPAGATION [METHODEN ZUR UNTERSUCHUNG DER RISSAUSBREITUNG]
Karl-Heinz Schwalbe 1980 16 p refs In GERMAN Presented at Deut. Verband fuer Materialpruefung e.V. (DMV) Kolloq. 1980, Berlin, 25-26 Sep. 1980

(GKSS-80/E/58; ISSN-0344-9629) Avail: NTIS HC A02/MF A01

An introduction to the methods of investigating crack propagation is presented. Macroscopic methods are described: optical measurements, compliance method, potential method, ultrasound method, acoustic emission, and crack front marking. Crack propagation is microscopically studied by means of a raster electron microscope. Author (ESA)

N82-30580# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.

FATIGUE OF METAL STRUCTURES SUSTAINING A VERY LARGE NUMBER OF LOAD CYCLES. THE FATIGUE THRESHOLD CONCEPT

Anders F. Blom Apr. 1982 13 p refs Presented at Intern. Assoc. for Bridge and Struct. Eng. (IABSE) Colloq. on Fatigue of Steel and Concrete Struct. Lausanne, Switzerland, 24-26 Mar. 1982

(FFA-TN-1982-06) Avail: NTIS HC A02/MF A01

The fatigue threshold stress intensity factor (Delta Kth) was evaluated. The influence of crack size, loading modes, stress ratio, thickness, frequency, microstructure, amplitude, temperature, and environment on Delta K is considered. Applications of Delta Kth are quoted. Specimens and test equipment for economical testing are discussed. A crack growth rate of magnitude 10 to the minus 8th power mm per cycle is suggested as a definition of a valid threshold value. Author (ESA)

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N82-30581 Royal Aircraft Establishment, Farnborough (England).

TRANSFORMATION OF DATA INTO A RASTER-SCAN FORMAT AND SOME IMAGE PROCESSING APPLICATIONS

P. A. Roberts Dec. 1981 50 p refs

(RAE-TR-81152; RAE-Space-610; BR82879) Copyright. Avail: Issuing Activity

Computer programs used to process and manipulate data that is in the form of either a series of contours, or a set of unconnected points, so that it can be transformed into a digital raster-scan format are described. Deliberate degradation in the spatial resolution of contour maps, and the use of terrain height information in conjunction with LANDSAT imagery, are discussed. As map spatial resolution degrades, peak intensity decreases for an area of sky mapped at 53 microns, assuming a two-dimensional Gaussian beam shape. With LANDSAT data, a height matrix can be generated from contours or from spot heights. Height, slope, variation in direct solar illumination, and aspect can be displayed as gray tone images. Author (ESA)

N82-30582*# National Aeronautics and Space Administration, Washington, D. C.

STUDIES AND PROPOSALS ON REMOTE SENSING PROGRAMS FOR THE EVALUATION AND MANAGEMENT OF RESOURCES IN LATIN AMERICA (COLUMBIA)

May 1982 25 p Transl. into ENGLISH of "Estudio y propuestas sobre programas de sensores remotos para la evaluacion y manejo de recursos en America Latina" (Columbia), 1982 p 1-27 Presented at the United Nations Reg. Seminar on Space Appl., Quito, Ecuador, 19-23 Apr. 1982 Transl. by SCITRAN, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76889; NAS 1.15:76889) Avail: NTIS HC A02/MF A01 CSCL 05A

A report is given on the situation in regard to diagnostic studies carried out on the use of remote sensing techniques at the regional level, and discussions held at international meetings on this topic. Studies and proposals presented by different organizations are discussed. It is concluded that a consultative body must be established at the regional level. Author

N82-30583*# National Aeronautics and Space Administration, Washington, D. C.

STUDIES ON THE APPLICATION OF REMOTE SENSING BY ARGENTINIAN ORGANIZATIONS

May 1982 9 p Transl. into ENGLISH of "Trabajos de Aplicacion de la Teledeteccion Organismos Nacionals (Argentina)" Buenos Aires, 1982 6 p Presented at the United Nations Reg. Seminar on Space Appl., 1982 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76897; NAS 1.15:76897) Avail: NTIS HC A02/MF A01 CSCL 05B

A bibliography is given of papers relating to the use of remote sensing information (mostly LANDSAT data) by various Argentinian organizations. R.J.F.

N82-30584*# National Aeronautics and Space Administration, Washington, D. C. Center of Remote Sensing.

PRESENT AND FUTURE PROGRAMS FOR THE APPLICATION OF REMOTE SENSING IN ARGENTINA

F. A. Alvarez May 1982 7 p Transl. into ENGLISH of "Programas Presentes y Futuros de Aplicacion de la Teleobservacion en la Rep. Arg." Argentina, 1982 p 1-6 Presented at the UN Reg. Seminar on Space Appl., 1982 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by National Space Research Commission

(Contract NASw-3541)

(NASA-TM-76898; NAS 1.15:76898) Avail: NTIS HC A02/MF A01 CSCL 05B

Remote sensing activities in Argentina are summarized. They include reception and processing of satellite data, applications, research, and training. S.L.

N82-30585*# Environmental Systems Research Inst., Redlands, Calif.

SURVEY OF SPATIAL DATA NEEDS AND LAND USE FORECASTING METHODS IN THE ELECTRIC UTILITY INDUSTRY Final Report

Apr. 1981 346 p refs

(Contract NAS2-10716)

(NASA-CR-166372; NAS 1.26:166372) Avail: NTIS HC A15/MF A01 CSCL 08B

A representative sample of the electric utility industry in the United States was surveyed to determine industry need for spatial data (specifically LANDSAT and other remotely sensed data) and the methods used by the industry to forecast land use changes and future energy demand. Information was acquired through interviews, written questionnaires, and reports (both published and internal). Author

N82-30586# Committee on Science and Technology (U. S. House).

NATIONAL MATERIALS AND MINERALS POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980

Washington GPO 1981 91 p Hearing before the Comm. on Sci. and Technol., 97th Congr., 1st Sess., no. 44, 28 Jul. 1981 (GPO-84-714) Avail: Committee on Science and Technology

The problems associated with national materials and minerals are discussed. The major materials concerns are on the user side of the process. That is as consumers, either industrial or as individuals, the user does not need simply a mineral or raw material in hand; it requires a finished product with a given set of properties. Thus the concern is with substitution, conservation, and processing, as well as supply. A strong comprehensive program in a materials research and development is recommended. S.L.

N82-30587# General Electric Co., Lanham, Md. Space Systems Div.

INTERACTIVE DIGITAL IMAGE PROCESSING FOR TERRAIN DATA EXTRACTION Final Report, Sep. 1980 - Sep. 1981

Thomas F. Wescott, William C. Dallam, and Christopher J. Peterson Sep. 1981 133 p

(Contract DAAK70-79-C-0153)

(AD-A114815; ETL-0277) Avail: NTIS HC A07/MF A01 CSCL 09/2

The phase 2 of an experimental study has been performed to investigate the feasibility and use of man-machine interactive digital image processing techniques when applied to the extraction of terrain analysis data from aerial imagery. This phase of the study concentrated on applying techniques to extract water resources data elements and on the development and coding of software and algorithms. The developed software and algorithms, pertained to filtering of themes, and image scaling. Two digital processing techniques to 'skeletonize' features, best mapped as lines, were established and tested with limited success. Relative to water resources data elements, success was achieved in the extraction of alignment of watercourses and shore line alignment of watercourses of water bodies. Partial success was achieved with the elements of delineation of wet areas and the identification of terminal points of watercourse segments. Image processing techniques for the extraction of areas subject to flooding and for the measurement of bank heights were not practical with the existing software. The development/implementation of software, and the processing and analysis of imagery was conducted at the General Electric Digital Image Analysis Laboratory. Author (GRA)

N82-30588# Defense Mapping Agency Aerospace Center, St. Louis, Mo. Scientific Data Dept.

IMAGE PROCESSING OF DIGITAL CARTOGRAPHIC DATA

Gerald Walter Johnston 5 Feb. 1982 39 p refs In ENGLISH; SPANISH summary Presented at the 12th Assembly Pan Am. Inst. of Geography and Hist., Santiago, 22-27 Mar. 1982

(AD-A115143) Avail: NTIS HC A03/MF A01 CSCL 08/2

The rapid advancement of cartography through the introduction of micro and minicomputers in the management and accuracy of digital elevation and cultural information is described. Advantages and disadvantages of the new processing techniques are stated. The algorithms and programming techniques are discussed with emphasis placed on resultant enhancements utilized by the cartographic analyst. The methods used at DMA to review the digital data bases through the use of the Image Manipulation Station are emphasized. System configuration, components, software development and image utilization are discussed. These comments are directed toward the various images (gray coded, shaded relief) and the quality assurance verification techniques associated with the image enhancements. Author

N82-30589# Edgerton, Germeshausen and Grier, Inc., Sunnyvale, Calif.

AERIAL GAMMA-RAY AND MAGNETIC SURVEY, COLUMBUS QUADRANGLE, OHIO Final Report

Jul. 1981 261 p refs

(Contract DE-AC13-76GJ-01664)

(DE81-028625; GJBX-225-81) Avail: NTIS HC A12/MF A01

The Columbus quadrangle covers a 7100 square mile area of south central Ohio which is located within the Midwestern Physiographic Province. Up to 6000 feet of Paleozoic strata overlie the east dipping Precambrian basement. Flat lying Quaternary glacial sediments cover a large part of the surface in the north and west regions of the quadrangle. A search of available literature revealed no known uranium deposits. Ninety-nine uranium anomalies were detected and are discussed briefly. Radiometric data reflect the presence of two zones of higher than average uranium anomaly occurrences. One zone is the northerly continuation of a trend observed in a contiguous quadrangle and occurs over undifferentiated Devonian and Mississippi sediments. Some anomalies appear to be culturally induced such as those in the vicinity of the city of Columbus. The magnetic data indicate more structural complexity in underlying rocks than inferred by the structural interpretation of the area. Author

N82-30590# Oak Ridge Gaseous Diffusion Plant, Tenn. Uranium Resource Evaluation Project.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR ST. MICHAEL QUADRANGLE, ALASKA

31 Jul. 1981 67 p refs

(Contract W-7405-eng-26)

(DE82-000854; GJBX-322-81; K/UR-356) Avail: NTIS HC A04/MF A01

Field and laboratory data are presented for 159 water samples from the St. Michael Quadrangle, Alaska. The samples were collected by Los Alamos National Laboratory; laboratory analysis and data reporting were performed by the Uranium Resource Evaluation Project at Oak Ridge, Tennessee. DOE

N82-30591# Oak Ridge National Lab., Tenn.

DEVELOPMENT OF PROCESSES FOR RECOVERY OF MINERALS FROM EASTERN SHALE

I. Spiewak, T. M. Gilliam, and M. D. Silverman 1981 19 p refs Presented at the IGT Symp. on Syn. Fuels from Oil Shale II, Nashville, 26 Oct. 1981

(Contract W-7405-eng-26)

(DE82-002872; CONF-811054-2) Avail: NTIS HC A02/MF A01

Eastern oil shales contain low concentrations of many potentially important metals, including aluminum, chromium, cobalt, iron, molybdenum, nickel, uranium and zinc. It is indicated that the minerals present in retort residues can be leached using sulfuric or hydrocloric acid. The retorting process and posttreatment by roasting affects the dissolution rate of various elements. The recovery of commercially useful materials such as aluminia, cobalt, molybdenum and uranium from these solutions is complex and needs further investigation. It is found that minerals recovery from retort residues may be economically justified and may provide environmental benefits. GRA

N82-30592# Oak Ridge National Lab., Tenn. Energy Div.

LAND-AND RESOURCE-USE ISSUES AT THE VALLES CALDERA

P. R. Intemann 1981 10 p refs Presented at the Geothermal Resources Council Ann. Meeting, Houston, Texas, 25-29 Oct. 1981 Submitted for publication

(Contract W-7405-eng-26)

(DE82-002726; CONF-811015-17) Avail: NTIS HC A02/MF A01

The Valles Caldera which processes a wealth of resources are described. Among the most significant of these are the geothermal energy resource and the natural resource. Wildlife, scenic, and recreational resources are considered components of the natural resource. The use of land in the caldera to achieve the full benefits of one resource may adversely affect the value of other resources. Measures can be taken to minimize adverse affects and to maximize the benefits of all the varied resources within the caldera as equitably as possible. GRA

N82-30593# California Univ., Livermore. Lawrence Livermore Lab.

LAWRENCE LIVERMORE NATIONAL LABORATORY OIL PROJECT Quarterly Report, Jul. - Sep. 1980

J. F. Carley, ed. 2 Nov. 1981 16 p refs

(Contract W-7405-eng-48)

(DE82-003643; UCID-16986-81-3) Avail: NTIS HC A02/MF A01

A preliminary process flowsheet for a countercurrent, above ground gas combustion retort system was developed and used to calculate the mass and energy balances for a 50,000-bbl/d shale oil plant. The ability of Campbell's kinetic model to predict gas evolution during pyrolysis of Colorado oil shales was tested. Losses of S during combustion of retorted shale and the reaction of char burned were determined. Leaching of oxidized shale in water removed Ca and Mg sulfates. E.A.K.

N82-30594# Department of Energy, Pittsburgh, Pa.

DEMONSTRATION OF LONGWALL MINING IN THIN SEAMS

Ernest A. Curth and Joseph A. Gill (Leeco, Inc.) 1981 39 p refs Presented at the 110th AIME Ann. Meeting, Chicago, 22 Feb. 1981
(DE82-000130; CONF-810203-15) Avail: NTIS HC A03/MF A01

The Government and Leeco concluded a cost-sharing agreement in 1976 to demonstrate longwall mining of a thin coalbed, 1 m or less, in a mine near Hyden, Ky. A premining investigation laid the groundwork for mine design and equipment specifications. Four-legged shields, a face conveyor, a stage loader and an in-web shearer were selected to operate on a 183 m face. Longwall mining began in 1979 and initially was slowed by low mining height and equipment problems. A rock mechanics program provides early warning capability and criteria for future mine design. Monitoring of surface effects is included. DOE

N82-30595# Dames and Moore, Park Ridge, Ill.
LONGWALL MINING IN ILLINOIS
P. J. Conroy and E. A. Curth 1981 18 p refs Presented at the 110th AIME Ann. Meeting, Chicago, 22 Feb. 1981 Prepared in cooperation with DOE, Pittsburgh
(DE82-000062; CONF-810203-16) Avail: NTIS HC A02/MF A01

The use of shields in adequate roof control are discussed. Short spans of exposed roof, quickly applied support, stability of structure, and full shelter for face crews are the advantages of shields. The application of shields designed to sustain high yield loads resulting in a mean load density of 862.2 KN/sq m encouraged the growth of longwall mining in the Illinois coal basin from one face to six. Double drum shearers of 1.5 x 10th to the 8th power kg/m (400 hp), using 995 volt power, with chainless haulage and high apacity face conveyors and stage loaders are standard face equipment. New coal mines are developed for longwall mining with panel blocks as large as limiting factors allow. They will have two active longwall faces and as many continuous miner units as are required for development and extraction. GRA

N82-30596# Gruy Federal, Inc., Houston, Tex.
EASTERN GAS SHALES PROJECT: OFFSET WELL TESTING PROGRAM. INTERFERENCE TESTING OF COLUMBIA GAS TRANSMISSION CORP., WELLS 1066A AND 10056B, MEIGS COUNTY, OHIO Final Report
A. Rdissi and John H. Goodrich Oct. 1981 18 p
(Contract DE-AC21-81MC-16120)
(DE82-002036; DOE/MC-16120/T1) Avail: NTIS HC A02/MF A01

The objective is to quantitatively determine variations in reservoir pressure performace between a contrcl well and two offset wells prior to and after microstimulation of the borehole. Field operations generally proceeded smoothly despite relatively complicated downhole equipment in the offset wells in which bottomhole pressures were monitored from three separate zones in the shales separated by three Lynes inflatable packers. This was the first time that this type of temporary completion was attempted in the eastern United States. Two failures of the electrical cable that transmitted pressure signals in well A and three packer failures in well A were the only mechanical problems encountered. These failures were quickly remedied and the tests were sucessfully concluded. DOE

N82-30597# Sandia Labs., Albuquerque, N. Mex. SPR Geotechnical Div.
STRATEGIC PETROLEUM RESERVE (SPR) GEOLOGICAL SITE CHARACTERIZATION REPORT, BIG HILL SALT DOME
R. J. Hart, Terri S. Ortiz, and Thomas R. Magorian Sep. 1981 174 p refs
(Contract DE-AC04-76DP-00789)
(DE82-001834; SAND-81-1045) Avail: NTIS HC A08/MF A01

The Big Hill Salt Dome were analyzed to determine its suitability for use in the strategic petroleum reserve (SPR). Objectives are to: (1) acquire, evaluate, and interpret existing data pertinent to geological characterization of the Big Hill Dome; (2) characterize the surface and near surface geology and hydrology; (3) characterize the geology and hydrology of the overlying cap rock; (4) define the geometry and geology of the dome; (5) determine the feasibility of locating and constructing 14 10 MMB storage caverns in the south portion of the dome; and (6) assess the effects of natural hazards on the SPR site. GRA

N82-30598# Federal Energy Regulatory Commission, Washington, D. C. Office of Electric Power Regulation.
WATER RESOURCES APPRAISAL FOR HYDROELECTRIC LICENSING: UPPER JAMES RIVER BASIN, VIRGINIA
Sep. 1981 59 p
(DE82-001859; FERC-0085) Avail: NTIS HC A04/MF A01

The water resources of the upper James River basin which covers 3330 sq. mi. in Virginia and West Virginia were evaluated. Data are presented on the physiography and economy of the basin, its existing and potential water resource development, existing hydroelectric projects, projected water requirements, flood control, and cooling water requirements for thermal power plants. GRA

N82-30599# Texas A&M Univ., College Station.
EVALUATION OF BRINE DISPOSAL FROM THE BRYAN MOUND SITE OF THE STRATEGIC PETROLEUM RESERVE PROGRAM. VOLUME 1: TWELVE-MONTH POSTDISPOSAL STUDIES Final Report
Roy W. Hann, Jr., ed. and Robert E. Randall, ed. Jul. 1981 571 p refs
(Contract DE-FC96-79PO-10114)
(DE82-001363; DOE/PO-10114/T1-Vol-1) Avail: NTIS HC A25/MF A01

A 12 month environmental study to evaluate the effects of the Bryan Mound brine discharge are reported. The areas of physical oceanography, analysis of the discharge plume, water and sediment quality, nekton, benthos, phytoplankton, zooplankton, and data management are addressed. GRA

N82-30600# Texas A&M Univ., College Station.
FLUID TREATMENT FOR STIMULATION OF RESERVOIR SANDSTONES AND ENHANCED RECOVERY OF OIL AND GAS Final Report
W. H. Huang Jun. 1981 12 p
(Grants DE-FG03-78ET-13405; ET-78-G-01-3307)
(DE82-001821; DOE/ET-13405/T1) Avail: NTIS HC A02/MF A01

Fluid treatment techniques which by means of well stimulation, is most effective in old producing sand wells with low permebility and which are severely damaged was studied. The productivity of these wells may be enhanced and restored to their original levels through stimulation with alkaline solution under specific unique conditions. It is shown that the original permeability of the reservoirs is restored or increased after damaged by brine solution. GRA

N82-30601# Bureau of Mines, Washington, D. C. Div. of Production/Consumption Data Collection and Interpretation.
MINERAL INDUSTRIES OF LATIN AMERICA Mineral Perspective Report
Orlando Martino, Doris Hyde, and Pablo Velasco Dec. 1981 128 p
(PB82-161001; LC-79-607095) Avail: NTIS HC A07/MF A01 CSCL 08I

The mineral industries of about 34 countries and areas in the Latin American region of the Western Hemisphere are summarized. Mineral reserves, production, international mineral trade, and the role of minerals within each country and in terms of world supply are reviewed in text and tables. The principal mining companies are listed, and basic information is presented on labor, energy, and transportation, relative to the mineral industries. Base maps for each country or area show the location of major mines, oilfields and gasfields, and plant facilities--including iron and steel works, nonferrous smelters and refineries, and cement plants. Maps also show major roads pipelines, railways, and ports that are important to mineral transportation and trade. GRA

N82-30602# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
HIGH ALTITUDE PHOTOGRAPHY TRAINING MANUAL

Mike L. Mathews, William A. Befort, Andrew S. Benson, Carolyn A. Clark, Robert N. Colwell, Richard E. Hinkle, Mike L. Mathews, James C. Prill, and James F. Ward Sep. 1981 177 p refs (Contract USDA/FS-53-3187-1-42)
(PB82-164096; LEMSCO-16864-Rev; NFAP-223) Avail: NTIS HC A09/MF A01 CSCL 05I

A training manual designed as a working tool for forest service personnel being introduced to the principles of high altitude photography is presented. The syllabus serves experienced photointerpreters and is a background for novice photointerpreters. High altitude photography, photointerpretation, and field exercise are also treated. GRA

N82-30603*# California Univ., Santa Barbara. Geography Remote Sensing Unit.
FOCIS: A FOREST CLASSIFICATION AND INVENTORY SYSTEM USING LANDSAT AND DIGITAL TERRAIN DATA Final Report
Alan H. Strahler, J. Franklin, C. E. Woodcook, and T. L. Logan (JPL, Pasadena, Calif.) Dec. 1981 68 p refs Sponsored in part by C.I.T.
(Contracts NAS9-15509; NAS7-100; USFS-53-9158-0-6362) (NASA-CR-11;6:18719; NAS 1.26:168719; PB82-164492; NFAP-255) Avail: NTIS HC A04/MF A01 CSCL 02F

Accurate, cost-effective stratification of forest vegetation and timber inventory is the primary goal of a Forest Classification and Inventory System (FOCIS). Conventional timber stratification using photointerpretation can be time-consuming, costly, and inconsistent from analyst to analyst. FOCIS was designed to overcome these problems by using machine processing techniques to extract and process tonal, textural, and terrain information from registered LANDSAT multispectral and digital terrain data. Comparison of samples from timber strata identified by conventional procedures showed that both have about the same potential to reduce the variance of timber volume estimates over simple random sampling. GRA

N82-30604# Lockheed Engineering and Management Services Co., Inc., Houston, Tex. Office of Advanced Photographic Technology Development and Applications Support.
OPERATIONAL TEST OF PANORAMIC AERIAL PHOTOGRAPHY FOR ESTIMATING ANNUAL MORTALITY OF PONDEROSA PINE CAUSED BY MOUNTAIN PINE BEETLE
R. D. Dillman, S. S. Shen, B. B. Eav, and W. B. White (Forest Service, Houston) Sep. 1981 37 p refs
(Contract USDA/FS-53-3187-0-29)
(PB82-164484; LEMSCO-16377; NFAP-274) Avail: NTIS HC A03/MF A01 CSCL 02F

The results and conclusions of an operational test of the procedures used in a mortality survey designed to provide timely data are given. The Front Range of Colorado, an area of approximately 12 million acres, was the study area. The survey design is based on three-stage sampling with selection according to probability proportional to size. Information from each stage is combined to estimate the number of trees killed and the associated volume loss from mountain pine beetle infestation. GRA

N82-30605# Lockheed Engineering and Management Services Co., Inc., Houston, Tex. Office of Advanced Remote Sensing Development and Applications Support.
HIGH-ALTITUDE RADAR ASSESSMENT OF THE VOLCANIC ERUPTION OF MOUNT ST. HELENS
R. D. Dillman, R. E. Hinkle, and R. L. Kerr Jun. 1981 40 p refs
(Contract USDA/FS-53-3187-0-29)
(PB82-164468; LEMSCO-16238-Rev-A; NFAP-241) Avail: NTIS HC A03/MF A01 CSCL 02F

High-altitude side-looking airborne radar imagery of the area surrounding Mount St. Helens was analyzed using only the characteristics of the radar returns in conjunction with pre-eurption high-altitude photography. The analyst was able to establish the areal extent of the changes in lakes, topography, and damage to timber caused by the eruption. GRA

N82-30606# Lockheed Engineering and Management Services Co., Inc., Houston, Tex. Office of Remote Sensing Technology Implementation.
PHOTOINTERPRETATION KEY FOR PINE REGENERATION ANALYSIS USING HIGH-ALTITUDE COLOR INFRARED PANORAMIC PHOTOGRAPHY Final Report
B. B. Eav, C. A. Clark, R. E. Kinkle, and J. C. Prill Aug. 1981 38 p refs
(Contract USDA/FS-53-3187-0-29)
(PB82-164450; LEMSCO-16379; NFAP-247) Avail: NTIS HC A03/MF A01 CSCL 02F

A photointerpretation key for analysis of pine regeneration was developed during the second of the three phases of a timber inventory project. The procedures used in developing the photointerpretation key are presented, and the resulting selective photointerpretation key with color illustrations (stereopairs) is presented This photointerpretation key represents a model application of high-altitude color infrared panoramic photography to timber inventory and should pave the way for more imaginative applications of optical bar technoloy to resource inventories. GRA

N82-30607# Earth Satellite Corp., Washington, D. C.
MULTIRESOURCE INVENTORY METHODS PILOT TEST. PHASE 1: PHOTOINTERPRETATION KEY FOR USE IN THE IDENTIFICATION OF WILDLAND RESOURCE FEATURES THROUGH THE DIRECT VISUAL ANALYSIS OF LANDSAT MULTISPECTRAL SCANNER IMAGERY
Robert R. Colwell, Philip G. Langley, Michael Armijo, and Robert N. Colwell Nov. 1981 132 p refs
(Contract USDA/FS-53-3187-9-45)
(PB82-164021; NFAP-203B; LEMSCO-16934) Avail: NTIS HC A07/MF A01 CSCL 02F

Conventional color and color infrared stereograms of low-altitude aerial photographs and matching conventional color and color infrared stereograms of ground photographs are compare for the purpose of identifying features on color composite imagery derived from digital data acquired by the LANDSAT multispectral scanner system. Keys were develoed based on intensive studies of selected test sites in three geographic regions: the Sierra Nevada Mountains of California, the Bitterroot Mountains of Idaho, and the Uplands Region of South Carolina. Author (GRA)

N82-30608# Lockheed Engineering and Management Services Co., Inc., Houston, Tex. Office of Remote Sensing Technology Implementation.
HIGH-ALTITUDE IMAGERY USER GUIDE
Richard E. Hinkle Aug. 1981 127 p refs
(Contract USDA/FS-53-3187-0-29)
(PB82-158353; LEMSCO-16312; NFAP-224) Avail: NTIS HC A07/MF A01 CSCL 02F

New and more efficient remote sensing methods to users in the field are presented. The high altitude aircraft and associated sensor systems are discussed. Applications in use, such as resource inventories, pest management, catastrophic damage assessment, resource management and planning are outlined. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-30609 American Society of Mechanical Engineers, New York. Solar Energy Div.
SOLAR ENGINEERING, 1981
Robert L. Reid, ed. (Tennessee Univ., Knoxville), L. Martin Murphy, ed. (Midwest Research Inst.), and Dan S. Ward, ed. (Colorado State Univ.) 1981 776 p refs Proc. of the 3rd Ann. Conf. of Systems Simulation, Econ. Anal./Solar Heating and Cooling Operational Results, Reno, Nev., 27 Apr. - 1 May 1981 Sponsored

in part by DOE
(CONF-810405; N-151746; LC-81-65532) Copyright. Avail: Issuing Activity

Solar heating and cooling systems for residential, commercial, and industrial applications are discussed. For individual titles, see N82-30610 through N82-30699.

N82-30610 Vitro Labs., Silver Spring, Md.
PERFORMANCE COMPARISON OF SOLAR SPACE HEATING SYSTEMS OF SELECTED ACTIVE SITES IN THE NATIONAL SOLAR DATA NETWORK
Paul W. Kendall and Hartley O. Holte *In* ASME Solar Eng., 1981 1981 p 1-14 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Composite performance results for selected active solar space heating commercial sites in the National Solar Data Network are presented. The performance of instrumented sites monitored through the 1979-1980 heating season are analyzed. Sites analyzed in depth include four representative major types of active solar heating systems. Parameters and performance indices presented include overall system delivered loads, solar fraction of load, solar savings ratio, coefficient of performance, energy collected and stored, and various subsystem efficiencies. The comparison of these factors has allowed evaluation of the relative performance of various system designs. A matrix of performance indices is presented for comparison of the representative solar heating installations. J.D.

N82-30611 Entec Products Corp., Fort Collins, Colo.
EXPERIENCES IN SOLAR COOLING SYSTEMS
Dan S. Ward (Colorado State Univ.) and Harjinder S. Oberoi *In* ASME Solar Eng., 1981 1981 p 15-27 (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Six of the nine solar cooling systems discussed in this paper had negative energy savings. In several cases the solar cooling system used substantially more energy than a conventional system could have been expected to use. Two systems, however, had significant energy savings. These systems (1 residential and 1 commercial) obtained system thermal efficiencies of 12.0 to 12.4 percent. Their system overall efficiences averaged 11.2 and 5.2 percent respectively. The residential-sized system achieved an annual energy savings of about 16.8 GJ/year, or approximately .34 GK/year/sqm of collector. The commercial system had equivalent values of 137 GJ/year or about .22 GJ/year/sqm of collector. It should be noted that these efficiencies are much lower than those of well-designed and properly controlled cooling systems in commercial sizes. However, with realistic system modifications and subsequent improvements in performance these solar cooling systems can be expected to achieve savings in nonrenewable energy sources of approximately 1.2 GJ/year/sq m of collector. These savings can be compared to those associated with solar space and domestic hot water heating systems of 2.2 and 2.5 GJ/year/sq m of collector, respectively. Author

N82-30612 Air Force Academy, Colo. Dept. of Civil Engineering.
THE CONTINUING PERFORMANCE OF THE USAF ACADEMY RETROFIT SOLAR HOUSE
Kenneth A. Cornelius and Joel D. Benson *In* ASME Solar Eng., 1981 1981 p 28-35 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The performance of a retrofit solar space heating system installed on a typical military family housing unit of mid-fifties construction at the U.S. Air Force Academy is analyzed. The home and the solar system were completely instrumented; system control and data storage were accomplished with an on-site microprocessor. The results presented cover the period from December 1975 to April 1979 and illustrate the effects on performance of varying the following parameters: (1) Energy conservation improvements to the home subsequent to installation of the solar system, (2) collector inclination angles, (3) collector working fluid flow rates, (4) collector flow rate control strategy, (5) storage mass and usable control temperatures, and (6) heat exchanger area between collector loop and storage. A side-by-side performance comparison of evacuated tube collectors to flatplate collectors and an overall system performance comparison to f-chart predictions are also included. Author

N82-30613 Acurex Corp., Mountain View, Calif.
OPERATION AND PERFORMANCE OF THE SOLAR STEAM SYSTEM AT THE JOHNSON AND JOHNSON PLANT IN SHERMAN, TEXAS
D. F. Brink, M. A. Matteo, and S. B. Youngblood *In* ASME Solar Eng., 1981 1981 p 36-42 refs (For primary document see N82-30609 21-44)
(Contract DE-AC03-77CS-31713)
Avail: Issuing Activity

The operation of a solar system that produces 174 C (345 F) steam is described and analyzed. The system uses parabolic through collectors to heat pressurized water which then flashes to steam in a flash boiler; This steam is fed into the plant steam main for use in several manufacturing processes. The facility's performance has been monitored continuously since it began operation in January 1980. The collector field typically has delivered energy to the flash boiler at an average daily efficiency of 25 to 35 percent, with an hourly average efficiency ranging from 38 to 42 percent at peak insolation periods. The daily and hourly values for energy collected and steam generated on a clear day in September and presented, as well as a monthly summary for the first 11 months of operation. Author

N82-30614 Vitro Labs., Silver Spring, Md.
PERFORMANCE OF SOLAR ENERGY HOT WATER SYSTEMS
M. A. Cramer, K. D. Evans, J. M. Rosenbusch, and R. A. Weinstein *In* ASME Solar Eng., 1981 1981 p 43-52 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A comparative analysis of solar energy hot water systems installed in sites monitored by the National Solar Data Network is presented. Two single family and two multi-family residences were selected for evaluation. These systems represent different types of hot water systems: passive hot water, active hot water with space heating, hot water with recirculation, and hot water thermosiphon. The data is provided in a number of forms including average monthly performance values for each hot water system, average monthly values for the summer and winter seasons, and estimated operational dollar savings. The conclusions are directed at both solar and conventional design features that cause good or bad performance. J.D.

N82-30615 Vitro Labs., Silver Spring, Md.
LONG-TERM PERFORMANCE TRENDS FOR TEN SOLAR SYSTEMS MONITORED BY THE NATIONAL SOLAR DATA NETWORK
Len G. Doak and Camille Gervasio *In* ASME Solar Eng., 1981 1981 p 53-57 refs (For primary document see N82-30609 21-44)
(Contract DE-AC01-79CS-30027)
Avail: Issuing Activity

Performance of ten solar sites in the National Solar Data Network are plotted over periods of two to three years. Performance trends for the collector array and the energy collection and storage subsystems are presented. Comparisons are made between performance trends for air and liquid collectors, and between active and passive systems. Observations on causes for trends over several years of operation are offered. Author

N82-30616 Tennessee Univ., Knoxville. Dept. of Mechanical and Aerospace Engineering.
PERFORMANCE OF A SOLAR AUGMENTED HEAT PUMP
Albert F. G. Bedinger, John J. Tomlinson, Robert L. Reid, and David J. Chaffin *In* ASME Solar Eng., 1981 1981 p 58-67 refs Sponsored in part by the Tennessee Valley Authority (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Performance of a residential size solar augmented heat pump is reported for the 1979-1980 heating season. The facility located in Knoxville, Tennessee, has a measured heat load coefficient of 339.5 watt/C (644 BTU/hr- F). The solar augmented heat pump system consists of 7.4 cu m of one inch diameter crushed limestone. The heat pump is a nominal 8.8 KW (2 1/2 ton)

high efficiency unit. The system includes electric resistance heaters to give the option of adding thermal energy to the pebble bed storage during utility off-peak periods, thus offering considerable load management capability. A 15 KW electric resistance duct heater is used to add thermal energy to the pebble bin as required during off-peak periods. Hourly thermal performance and on site weather data was taken for the period November 1, 1979, to April 13, 1980. Thermal performance data consists of heat flow summations for all modes of the system, pebble bed temperatures, and space temperature. Weather data consists of dry bulb temperature, dew point temperature, total global insolation (in the plane of the collector), and wind speed and direction. An error analysis was performed and the least accurate of the measurements was determined to be the heat flow at 5%. Solar system thermal performance factor was measured to be 8.77. The heat pump thermal performance factor was 1.64. Total system seasonal performance factor was measured to be 1.66. Using a modified version of TRNSYS, the thermal performance of this system was simulated. When simulation results were compared with data collected onsite, the predicted heat flow and power consumption generally were within experimental accuracy. J.D.

N82-30617 Colorado State Univ., Fort Collins. Solar Energy Applications Lab.

DEVELOPMENT AND IMPROVEMENT OF LIQUID SYSTEMS FOR SOLAR SPACE HEATING AND COOLING: CSU SOLAR HOUSE 1

G. O. G. Loef, W. S. Duff, and C. E. Hancock *In* ASME Solar Eng., 1981 1981 p 68-80 refs (For primary document see N82-30609 21-44)

Avail: Issuing Activity

The performance of several types and numerous modifications of solar heating and cooling systems in three residential buildings is described. The performance of which has been closely monitored and compared. At approximately one-year intervals, the systems have been modified or changed in ways which are designed to improve solar energy delivery, operating convenience, reliability, economy, and overall practicality. The emphasis is on system integration of commercially available components. Systems in which liquids are used for solar heat collection and storage were also employed. Heat is supplied to the building by forced warm air heated by exchange with solar heated water from storage; space cooling is provided by lithium bromide absorption refrigeration driven by solar heated water. Service hot water is by exchange with the main solar collection and storage system, and auxiliary energy is by use of gas or electric heat supply equipment. Automatic controls regulate all operations, and extensive monitoring and data logging equipment provide continuous records of all significant operating conditions and results. J.D.

N82-30618 Alabama Univ., Huntsville. Solar Energy Center.

COMMERCIAL SOLAR WATER HEATING SYSTEMS OPERATIONAL TEST

Gerald R. Guinn, Bruce J. Novell, and Leigh L. Hummer *In* ASME Solar Eng., 1981 1981 p 81-91 refs (For primary document see N82-30609 21-44)

Avail: Issuing Activity

The performance of six commercially available solar water heaters is evaluated. The six systems are installed side-by-side on a typical roof structure and provide two examples each of silicone oil, antifreeze, and drain-back freeze protection. Each system is instrumented with Btu and KWH meters to assess performance under an imposed load profile. The systems, the instrumentation, operational results acquired over a 19 month interval, and performance over a 4 month interval are described. J.D.

N82-30619 Utah Univ., Salt Lake City. Dept. of Mechanical and Industrial Engineering.

EVALUATION OF FIVE SOLAR DOMESTIC WATER HEATING SYSTEMS

S. R. Swanson and R. F. Boehm *In* ASME Solar Eng., 1981 1981 p 92-98 refs Sponsored in part by Utah Power and Light Co. (For primary document see N82-30609 21-44)

Avail: Issuing Activity

Five solar domestic water heaters were tested over a period of two years. Four of the systems are similar and utilize an experimental dual preheat tank arrangement with external heat exchanger. The fifth system uses a single tank with in-tank heat exchanger. Measurements were made of useful energy delivered to storage, hot water used, and electrical energy used for pumps and auxiliary heating. The results indicated that overall performance was lower than had been expected. Short term diagnostic tests were run, and a number of factors were determined to have a negative effect on system performance. These were low collector tilt angle, high pumping energy, mismatch of flows in heat exchanger, high thermal mass external to the storage tank, and a possible decrease in collector performance. Author

N82-30620 Philadelphia Electric Co., Pa. Commerical Operations Dept.

SOLAR DOMESTIC WATER HEATING PERFORMANCE TEST PROGRAM Interim Report

Richard H. Auris and Walter J. Draving, Jr. *In* ASME Solar Eng., 1981 1981 p 99-103 (For primary document see N82-30609 21-44)

Avail: Issuing Activity

A test program operated since early 1978 to evaluate commercially available solar domestic water heating systems in actual installations is described. The readiness and expertise of suppliers and installers are assessed and the interaction between solar energy and utility power determined. Six different solar water heating systems were retrofitted to employees' homes in the Philadelphia area. In addition, existing solar systems in seven customers' homes were monitored. These 13 systems were instrumented to document the solar energy usage, purchased power, water usage, and water inlet, preheat and delivery temperature. One year of measurements were collected and analyzed. Operation of water and anti-freeze systems during periods of below freezing temperatures were compared. Maintenance and repair records permit an estimate of service costs to be made. Author

N82-30621 Pennsylvania State Univ., Middletown.

PARTIAL RESULTS SUMMARY FOR SOLAR DOMESTIC HOT WATER MONITORING IN PENNSYLVANIA

William K. Aungst *In* ASME Solar Eng., 1981 1981 p 104-111 refs (For primary document see N82-30609 21-44)

Avail: Issuing Activity

A monitoring program for approximately fifty solar domestic hot water systems in Pennsylvania is described. The monitoring program utilizes relatively low cost instrumentation, which provides information which is collected by each individual homeowner. The data is then used to estimate each systems performance. Some of the more significant results obtained to date are summarized and the amount of solar energy utilized by the systems to aid the heating of the domestic hot water load determined. The dollar savings the homeowners are realizing through the use of their solar hot water systems are estimated. J.D.

N82-30622 Colorado State Univ., Fort Collins. Solar Energy Applications Lab.

DEVELOPMENT OF A DAY BY DAY SIMULATION OF SOLAR SYSTEMS

W. S. Duff, G. J. Favard, and K. R. DenBraven *In* ASME Solar Eng., 1981 1981 p 112-121 refs Sponsored in part by Midwest Research Inst. (For primary document see N82-30609 21-44)

Avail: Issuing Activity

Advantages of a simulation program for solar heating, cooling, and hot water systems using event incremented time-steps include short running times with accuracies similar to those of short fixed increment time-steps. Event incrementing is made possible through the use of analytic functions for data input. Currently, the ambient temperatures and radiation are entered as daily cosine functions or constants over a time-step. Loads may be represented as cosine waves, constants, or point values. This approach yields a substantially compressed data representation and allows direct analytic solutions for the system of nonlinear differential equations over long time-steps. These time-steps do not occur at fixed intervals, but instead are determind by events such as collector pump turn-on time, domestic hot water withdrawal, or a switch from solar to auxilliary usage. Resulting accuracies are close to those obtained from short time-step programs, while computer times are greatly reduced. Author

N82-30623 Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
THE MEASURED PERFORMANCE OF AN AIR THERMOSYPHON SYSTEM
L. S. Marshall, P. J. Burns, and C. B. Winn *In* ASME Solar Eng., 1981 1981 p 122-129 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A simulation scheme was developed to evaluate a passive air thermosyphon system consisting of a double glazed collector, ducting, backdraft dampers to prevent reverse circulation of the air, and a rock box in the north wall for thermal storage. A test cell been constructed in order to obtain actual data. Temperature measurements and flow visualization in the air ducts are studied. The thermal performance of the system is evaluated by using measured data as input for the simulation model. A.R.H.

N82-30624 Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
A SEQUENTIAL FILTER USED FOR PARAMETER ESTIMATION IN A PASSIVE SOLAR SYSTEM
C. Byron Winn and D. V. Pryor *In* ASME Solar Eng., 1981 1981 p 130-134 (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The use of a sequential least squares filter for estimating passive solar system parameters is presented as it applies to certain types of systems. The method given is used to identify a particular existing system, and the results are given. Various sampling rates used by the filter are compared with a view toward selecting a reasonable sampling rate. Author

N82-30625 California Univ., Berkeley. Lawrence Berkeley Lab.
INTERACTION OF A SOLAR SPACE HEATING SYSTEM WITH THE THERMAL BEHAVIOR OF A BUILDING
Christian Vilmer, Mashuri L. Warren, and David Auslander (California Univ., Berkeley) *In* ASME Solar Eng., 1981 1981 p 135-144 refs (For primary document see N82-30609 21-44) (Contract W-7405-eng-48)
Avail: Issuing Activity

The thermal behavior of a building in response to heat input from an active solar space heating system is analysed to determine the effect of the variable storage tank temperature on the cycling rate, on-time, and off-time of a heating cycle and on the comfort characteristics of room air temperature swing and of offset of the average air temperature from the setpoint (droop). A simple model of a residential building, a fan coil heat-delivery system, and a bimetal thermostat are used to describe the system. A computer simulation of the system behavior has been developed and verified by comparisons with predictions from previous studies. The system model and simulation are then applied to determine the building response to typical hydronic solar heating system for different solar storage temperatures, outdoor temperatures, and fan coil sizes. The simulations were run only for those cases where there was sufficient energy from storage to meet the building load requirements. The results indicate that to maintain room temperatures within comfort limits by minimizing both swing and droop, a hydronic solar space heating system requires a control system that adjusts anticipation and setpoints in relation to the outdoor and the storage tank temperatures. J.D.

N82-30626 Argonne National Lab., Ill.
EVALUATION OF RELIABILITY OF OPERATIONAL SOLAR ENERGY SYSTEMS
J. Mavec, E. Waite (Argonne National Lab., Idaho Falls, Idaho), and R. M. Wolosewicz *In* ASME Solar Eng., 1981 1981 p 145-150 refs Sponsored by DOE (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The reliability of two solar-energy systems using air as the heat transfer medium was studied using failure modes and effects analysis to examine the controls of the systems for three operating modes. Principal components are identified for each mode, and a fault tree and reliability block diagram are constructed to structure the fault or failed sequence. Established failure rates are assigned to each component, and an exponential failure distribution is assumed. For components operating on demand at a given average frequency, the adjusted demand and normal operating failure rates are combined to reflect the total contribution. Representative operational times and component frequencies are found for each operating mode. A fault-tree computer code obtains results at each level (component, outset, and tree) using repairable and nonrepairable models. A.R.H.

N82-30627 Washington Univ., Seattle.
THERMAL MODELING OF MULTI-ROOM STRUCTURES
A. F. Emery, C. J. Kippenhan, and D. R. Heerwagen *In* ASME Solar Eng., 1981 1981 p 151-157 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A series of numerical simulations, based upon the nodal network program UWENSOL, was made to predict the hourly thermal response of a typical Pacific Northwest residence and its daily and annual energy requirements. The calculations showed that the response of the house is dependent upon its configuration, the weather and the manner in which the heating or cooling is done. In general, during winter time in the Pacific Northwest it is possible to adequately simulate the house as a collection of thermally independent zones. This eliminates the need to consider the house as a single structure composed of thermally interacting zones and permits the efficient simulation of houses which are architecturally complicated. However, during very hot summer periods, too much energy is conducted through the walls to allow the independent zone simulation to be used and the structure must be treated as an entity. Author

N82-30628 California Univ., Irvine. School of Engineering.
AN INVESTIGATION OF HORIZONTAL STORAGE TANKS FOR SOLAR HOT WATER SYSTEMS
M. F. Young and J. W. Baughn *In* ASME Solar Eng., 1981 1981 p 159-167 refs Prepared in cooperation with California Univ., Davis (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The thermal behavior of a horizontal storage tank for possible use in a solar domestic hot water system was investigated analytically and experimentally. The experimental results demonstrate that axial temperature gradients is negligible compared to vertical temperature gradients. Severe mixing of the tank occurred when loads were removed unless a diffuser manifold was placed on the make-up water inlet. The analytical model used was one-dimensional (vertical) with some degree of mixing at the inlet and outlet boundaries. The temperatures at the top of the tank were predicted fairly well, but the temperatures at the bottom deviated somewhat from the predictions. It appears that some additional interior mixing not included in the present model occurs. A.R.H.

N82-30629 California Univ., Irvine. School of Engineering.
COMPARISON OF SOME RESULTS OF PROGRAM SHOW WITH OTHER SOLAR HOT WATER COMPUTER PROGRAMS
Marvin F. Young and James W. Baughn *In* ASME Solar Eng., 1981 1981 p 168-174 refs Prepared in cooperation with California Univ., Davis (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The SHOW (solar hot water) computer program is capable of simulating both one and two tank designs of thermosiphon and pumped solar domestic hot water systems. SHOW differs in a number of ways from other programs, the most notable of which is the emphasis on a thermal/hydraulic model of the stratified storage tank. The predicted performance for a typical two tank pumped system, computed by Program SHOW are compared, with results computed using F-CHART and TRNSYS. The results show fair to good agreement between the various computer programs when comparing the annual percent solar contributions. SHOW is also used to compute the expected performance of a two tank thermosiphon system and to compare its performance to the two tank pumped system. Author

N82-30630 Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
ANALYSIS OF THE PERFORMANCE AND SPACE CONDITIONING IMPACTS OF DEDICATED HEAT PUMP WATER HEATERS
Louise Morrison and Joel Swisher *In* ASME Solar Eng., 1981 1981 p 175-186 refs (For primary document see N82-30609 21-44)

Avail: Issuing Activity

The development and testing of the newly-marketed dedicated heat pump water heater (HPWH) are described. This system utilizes an air-to-water heat pump, costs about $1,000 installed, and obtains a coefficient of performance (COP) of about 2.0 in laboratory and field tests. To investigate HPWH performance and space conditioning impacts, a simulation was developed to mode the thermal performance of a residence with resistance baseboard heat, air conditioning, and either heat pump or resistance water heating. The building characteristics are adapted for three U.S. geographical areas (Madison, Wisconsin; Washington, D.C.; and Ft. Worth, Texas), and the system is simulated for a year with typical weather data. The thermal network includes both a house node and a basement node so that the water heating equipment can be simulated in an unconditioned basement in Northern cities and in a conditioned first-floor utility room in Southern cities. Author

N82-30631 California Univ., Berkeley. Lawrence Berkeley Lab. Passive Solar Analysis and Design Group.

DESCRIPTION OF AN EXACT, RECURSIVE METHOD TO SIMPLIFY SHADING CALCULATIONS

A. David Nawrocki and Ronald Kammerud *In* ASME Solar Eng., 1981 1981 p 187-195 refs (For primary document see N82-30609 21-44)

(Contract W-7405-eng-48)

Avail: Issuing Activity

An exact, recursive method called SHADE is described which attempts to simplify shading calculations as performed by a programmable calculator or microcomputer. Preliminary applications of SHADE using a Hewlett Packard HP-41C programmable calculator are outlined. For a given solar hour, SHADE is used to compute the following quantities for overhang and side fin combinations which shade various openings: the percentage of the total area of the opening which is shaded; the shaded area itself; the cosine of the angle of incidence between the Sun and glazing surface; the direct insolation at this surface, with and without shading; and the direct solar power at this surface, with and without shading. A.R.H.

N82-30632 Wisconsin Univ., Madison. Solar Energy Lab.

A REGIONAL COMPARISON OF SOLAR, HEAT PUMP, AND SOLAR HEAT PUMP SYSTEMS

B. E. Manton and J. W. Mitchell *In* ASME Solar Eng., 1981 1981 p 196-203 refs Sponsored by DOE (For primary document see N82-30609 21-44)

Avail: Issuing Activity

The thermal and economic performance of the parallel and series solar-heat pump systems, stand-alone solar and stand-alone heat pump systems for residential space and domestic hot water heating is being compared for the United States using FCHART 4.0. The results are useful for a regional assessment of the viability of the different systems, and for assessing policies that will encourage the implementation of the most energy efficient system. A.R.H.

N82-30633 Los Alamos Scientific Lab., N. Mex.

THE SOLAR LOAD RATIO METHOD APPLIED TO COMMERCIAL BUILDING ACTIVE SOLAR SYSTEM SIZING

Norman M. Schnurr, Bruce D. Hunn, and Kenneth D. Williamson, III (New Mexico State Univ., Las Cruces) *In* ASME Solar Eng., 1981 1981 p 204-215 refs (For primary document see N82-30609 21-44)

Avail: Issuing Activity

The solar load ratio (SLR) design method was extended to commercial building combined active space heating and building service hot water (BSHW) systems and BSHW systems alone. Both liquid and air heating systems are considered. The hour-by-hour computer simulations used to calculate system performance were carried out using the component-based simulator in the DOE-2 building energy analysis computer program. Hourly weather data for several cities were used. The major parameters that characterize the solar heating system are the generic collector type (defined by the slope and intercept of the collector efficiency curve), geographical location, and the hot water delivery temerature. The results are correlated using the SLR (the ratio of incident solar radiation to the building load imposed upon the heating coil) on either a monthly or an annual basis. Author

N82-30634 Solaron Corp., Englewood, Colo.

A RELIABLE METHOD FOR RATING SOLAR COLLECTORS

George O. G. Loef, Dennis Jones, and Lilburn E. Shaw *In* ASME Solar Eng., 1981 1981 p 216-225 refs (For primary document see N82-30609 21-44)

Avail: Issuing Activity

A method is outlined which accurately and meaningfully rates solar collectors in all parts of the country. The basis for the rating is a first order efficiency curve developd from test results obtained in an accredited laboratory by methods prescribed in the ASHRAE 93-77 procedure. Annual solar heat delivery per square foot of collector is then calculated for standard hot water and space heating applications in cities throughout the U.S. by use of the F-Chart procedure. Four collectors are analyzed by the FCHART method for space heating applications in five U.S. cities at five solar load fractions. It is shown that although all the collectors have comparable outputs under some conditions, they perform quite differently in different parts of the country and at different ratios of collector area to heating load. A.R.H.

N82-30635 California Univ., San Diego, La Jolla. Dept. of Applied Mechanics and Engineering Sciences.

DESIGN AND CONTROL TRADEOFFS FOR ROCKBINS IN PASSIVELY SOLAR HEATED HOUSES WITH HIGH SOLAR FRACTIONS

G. Vered and A. V. Sebald *In* ASME Solar Eng., 1981 1981 p 226-238 refs (For primary document see N82-30609 21-44) (Contract DE-AC04-79AL-10891)

Avail: Issuing Activity

Performance of active and passive rockbins are compared in Albuquerque NM, Santa Maria CA and Madison WI. The basic house is assumed to contain both Trombe wall and direct gain. The latter are assumed to be optimally sized and controlled for each weather zone. It is demonstrated that rockbins can be used to advantage in reduction of the early morning auxiliary energy consumption peak common to passive houses with night setback thermostats. The paper also analyzes performance sensitivity to rockbin configuration (active, radiant slab top down charge, radiant slab bottom up charge), and to control strategies for charging and discharging. Effects of fan energy are included. New results on the thermal conductivity of passive rockbeds are outlined. These results are shown to be crucial to understanding the role of rockbins in passive houses. Author

N82-30636 Maryland Univ., College Park. Dept. of Mechanical Engineering.

TRANSIENT SIMULATION OF ABSORPTION MACHINES

D. K. Anand, R. W. Allen, and B. Kumar *In* ASME Solar Eng., 1981 1981 p 239-247 refs (For primary document see N82-30609 21-44)

Avail: Issuing Activity

A model for a water-cooled Lithium-Bromide/water absorption chiller is presented. Its transient response both during the start-up phase and during the shut-off period is predicted. The simulation model incorporates such influencing factors as the thermodynamic properties of the working fluid, the absorbent, the heat-transfer configuration of different components of the chiller and related physical data. The time constants of different components are controlled by a set of key parameters that have been identified. The results show a variable but at times significant amount of time delay before the chiller capacity gets close to its steady-state value. The model is intended to provide an insight into the mechanism of build-up to steady-state performance. By recognizing the significant factors contributing to transient degradation, steps can be taken to reduce such degradation. B.W.

N82-30637 Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.

GROUND COUPLED SOLAR HEAT PUMP: ANALYSIS OF FOUR OPTIONS

John W. Andrews *In* ASME Solar Eng., 1981 1981 p 248-259 refs Sponsored by DOE (For primary document see N82-30609 21-44)

Avail: Issuing Activity

Heat pump systems which utilize both solar energy and energy withdrawn from the ground are analyzed using a simplified procedure which optimizes the solar storage temperature on a monthly basis. Four ways of introducing collected solar energy to the system are optimized and compared. These include use of activity collected thermal input to the heat pump; use of collected solar energy to heat the load directly (two different ways); and use of a passive option to reduce the effective heating load. Author

N82-30638 University of the West Indies, Saint Augustine (Trinidad). Dept. of Mechanical Engineering.
OPTIMUM OPERATING CONDITIONS OF ABSORPTION REFRIGERATION SYSTEMS FOR FLAT PLATE COLLECTOR TEMPERATURES
G. S. Kochhar and S. Satcunanathan *In* ASME Solar Eng., 1981 1981 p 260-267 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

An evaluation is presented of the performance of absorption refrigeration cycles with a view to determining optimum conditions for use with flat plate solar collectors. Equations for the thermodynamic performance analysis of the NH3 - H2O systems are formulated and solved for various combinations of temperatures of the heat interacting components of the system using available equilibrium thermodynamic property equations. Equilibrium thermodynamic property equations for the H2O - LiBr pair are developed and used to extend the performance analysis to the H2O LiBr absorption cycle. It is shown that the COP increases sharply initially with generator temperature, reaches a peak value and levels off thereafter. COP also increases with lowering of condensing/absorption temperatures, the increases being significant for generation temperatures below about 80 C, which is well within the effective operational range of flat plate solar collectors. Author

N82-30639 Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
THE IMPLEMENTATION OF AN ANALYTICAL VERIFICATION TECHNIQUE ON THREE BUILDING ENERGY ANALYSIS CODES: SUNCAT 2.4, DOE 2.1, AND DEROB III
David Wortman, Bob ODoherty, and Ron Judkoff *In* ASME Solar Eng., 1981 1981 p 268-276 Sponsored by DOE (For primary document see N82-30609 21-44)
Avail: Issuing Activity

An analytical verification technique for building energy analysis codes was developd. For this technique, building models are developed that can be both solved analytically and modeled using the analysis codes. The output of the codes is then compared with the analytical solutions. In this way, the accuracy of selected mechanisms in the codes can be verified. The procedure consists of several tests and was run on SUNCAT 2.4, DOE 2.1, and DEROB III. The results are presented and analyzed. Author

N82-30640 Vitro Labs., Silver Spring, Md.
ASSESSMENT OF AIR SOLAR SYSTEM PERFORMANCE WITH ALTERNATE METHODS OF ANALYSIS
Steven L. Taylor *In* ASME Solar Eng., 1981 1981 p 277-289 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

As an alternative to using detailed measurements to determine the energy losses of an active air solar system, the solar space heating contribution of solar systems is evaluated using the building as the control volume for the analysis. The method assesses solar performance using a minimum of instrumentation. A second method, used by some designers, for active solar system performance is presented which uses modified degree day design. It uses only the active space heating system as the control volume for the analysis. Discrepancies in the results suggest that space heating designers consider all heating energy flows into the building and not just the active space heating system. B.W.

N82-30641 Boeing Computer Services Co., Tukwila, Wash. Energy Technology Applications Div.
VALIDATION OF A ROCK BED THERMAL ENERGY STORAGE MODEL
F. G. vonFuchs *In* ASME Solar Eng., 1981 1981 p 290-298 refs (For primary document see N82-30609 21-44)
(Contract DE-AC02-77CS-34482)
Avail: Issuing Activity

The development of a one dimensional rock bed model utilizing historical models and those used by current researchers is discussed. Heat transfer coefficients and assumptions, pressure drop, rock size and void fraction, axial conductivity, and other parameters are considered. Since the solution of the model differential equations can introduce instabilities and inaccuracies in the results, a discussion of the mathematical techniques used is included. The validation process consisted of formulating a test plan, instrumenting the rock bed, performing the tests then comparing the results with a simulation using the same parameters used in the test. Validation was quite good and is illustrated by several figures comparing observed and predicted axial temperature distributions. Author

N82-30642 California Univ., Berkeley. Lawrence Berkeley Lab. Passive Solar Analysis and Design Group.
VERIFICATION OF BLAST BY COMPARISON WITH MEASUREMENTS OF A SOLAR DOMINATED TEST CELL AND A THERMALLY MASSIVE BUILDING
Fred Bauman, Brandt Anderson, William L. Carroll, Ronald Kammerud, and Nina E. Friedman *In* ASME Solar Eng., 1981 1981 p 299-308 refs (For primary document see N82-30609 21-44)
(Contract W-7405-eng-48)
Avail: Issuing Activity

As part of an ongoing effort to use empirical data to test computational accuracy of the building energy analysis computer program BLAST (2) two verification studies are reported. In the first, comparisons between temperatures measured in a direct solar gain test cell and temperatures predicted by the program have been made. The comparisons were performed for two distinct climate periods; the simulations were driven by weather data collected at the test cell site in Los Alamos, New Mexico. The test cell configuration and weather data manipulations are described; quantitative evaluations of the comparisons between measured and predicted interior temperatures are presented; limitations of the comparisons are discussed; and sensitivites of the simulation results to uncertainties in the measured parameters are examined. Author

N82-30643 Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
A COMPARISON OF DOE-2 AND TRNSYS SOLAR HEATING SYSTEM SIMULATION
Anthony Eden and Marion Morgan *In* ASME Solar Eng., 1981 1981 p 309-318 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The output of the solar energy section of DOE-2 called Component Based Simulator (CBS) and TRNSYS was analyzed. The adequacy and sensitivity of CBS was investigated when various active solar energy collectors and systems were interfaced with a standard space heating system. The analysis included both single- and double-glazed collectors with selectively and nonselectively coated absorbing surfaces, located in four different environments. The results of the study show remarkable agreement between the two programs. Minor differences in annual average collector efficiency and annual average part solar are illustrated as are the thermal load and insolation. In addition, difficulties encountered when performing this study modeling the collector systems are discussed and recommendations offered to facilitate the solar simulation process for future CBS users. B.W.

N82-30644 Vitro Labs., Silver Spring, Md.
HOURLY USE PROFILES FOR SOLAR DOMESTIC HOT WATER HEATERS IN THE NATIONAL SOLAR DATA NETWORK
E. J. Barvir, L. G. Doak, R. E. Waterman, and C. Gervasio *In* ASME Solar Eng., 1981 1981 p 319-324 refs (For primary document see N82-30609 21-44)
(Contract DE-AC01-79CS-30027)
Avail: Issuing Activity

Daily hot water rates of consumption and the Hourly Profiles of Daily Hot Water Consumption for single and multiple family dwellings are provided. These new statistics obtained from the National Solar Data Network (NSDN) are significantly different

from the statistics currently being used in TRNSYS, SOLCOST and F-Chart. The NSDN statistics suggest that both the daily demand and hourly use profiles used in performance models should be revised. B.W.

N82-30645 Regional Systems Services Group, Inc., Englewood, Colo.
IMPLEMENTATION OF AN AMBIENT TEMPERATURE OBSERVER-PREDICTION (ATOP)
Norman L. Weaver and W. S. Duff (Colorado State Univ.) *In* ASME Solar Eng., 1981 1981 p 325-329 refs Sponsored by DOE (For primary document see N82-30609 21-44)
Avail: Issuing Activity

An ATOP type control algorithm was developed and implemented on a programmable controller to set the rate of charge for a commercial off-peak electric furnace installed in CSU Solar House I. During a 15 day trial ATOP tracked ambient temperature to within 3.0 C rms and predicted following day average temperature to within 3.8 C rms. The ATOP based off-peak controller held peak demand to 9.5 kilowatts during the test period. For the same conditions the factory stock control hardware for the commercial off-peak furnace would have generated a peak demand of 18.8 kilowatts. However, the superior performance of the ATOP-based controller is due principally to the fact that it accounts for available energy in solar storage and in the off-peak furnace itself (which the factory control hardware does not). Author

N82-30646* Ford Aerospace and Communications Corp., Newport Beach, Calif. Aeronutronic Div.
CONTROL SYSTEM DEVELOPMENT FOR AN ORGANIC RANKING CYCLE ENGINE
F. M. Bergthold, Jr., D. G. Fulton, and H. J. Haskins *In* ASME Solar Eng., 1981 1981 p 330-336 refs (For primary document see N82-30609 21-44)
(Contract JPL-955115)
Avail: Issuing Activity

An organic Rankine cycle engine is used as part of a solar thermal power conversion assembly (PCA). The PCA, including a direct-heated cavity receiver and a shaft-mounted alternator, is mounted at the focal point of a parabolic dish concentrator. The engine controls are required to maintain approximately constant values of turbine inlet temperature and shaft speed, despite variation in the concentrated solar power input to the receiver. The controls design approach, system models, and initial stability and performance analysis results are presented herein. Author

N82-30647 Vitro Labs., Silver Spring, Md.
ANALYSIS, SIMULATION AND DIAGNOSIS OF SOLAR ENERGY CONTROL SYSTEM ANOMALIES
Robert E. Waterman *In* ASME Solar Eng., 1981 1981 p 337-344 refs (For primary document see N82-30609 21-44)
(Contract DE-AC01-79CS-30027)
Avail: Issuing Activity

Control system anomalies in solar energy systems are examined and methods employed to investigate and diagnose controller malfunctions involve a blend of mathematical modelling and analysis of long term data from three solar homes in the National Solar Data Network. The diagnostic methods and results of this study should be of immediate practical value to designers, installers and owners concerned with obtaining maximum performance from their solar energy systems. B.W.

N82-30648 Science Applications, Inc., Albuquerque, N. Mex. Alternate Energy Systems Div.
SIMPLIFIED METHODOLOGY FOR CHOOSING CONTROLLER SET-POINTS
Jerry M. Alcone and Ronald W. Herman *In* ASME Solar Eng., 1981 1981 p 345-347 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The selection of controller delta T set-points for solar energy systems must be made carefully to assure that unnecessary cycling of pump or fan motors does not occur, and that a maximum amount of the available solar energy is collected. An analysis of how set-points can be chosen based on the efficiency curve for the collector is given. R.J.F.

N82-30649 Wisconsin Univ., Madison. Solar Energy Lab.
A TRNSYS MICROPROCESSOR CONTROLLER
L. P. Piessens, W. A. Beckman, and J. W. Mitchell *In* ASME Solar Eng., 1981 1981 p 348-357 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A control component for use with the TRNSYS simulation program was developed that simulates the operation of a microprocessor controller. The component uses a truth table in combination with comparisons between input signals to generate appropriate output control signals. Although temperatures are normal input signals, other inputs such as flow rate and solar radiation can also be used. Together with other standard TRNSYS components, proportional control, night setbacks, and time delays can be simulated. Examples are given of normal operation, and of situations in which instabilities occur. The use of the truth table for error detection is illustrated. Some general rules for selecting timestep and error bounds are formulated. An economic comparison is made between on/off and optimal control strategy to illustrate the use of the model. R.J.F.

N82-30650 Drexel Univ., Philadelphia, Pa. Dept. of Electrical and Computer Engineering.
EXPERIMENTAL VALIDATION OF DYNAMIC CONTROL MODELS
P. R. Herczfeld, R. Fischl, G. Vardakas, and R. L. T. Wolfson (Middlebury College, Vt.) *In* ASME Solar Eng., 1981 1981 p 358-366 refs (For primary document see N82-30609 21-44)
(Contracts DE-ASQ2-77CS-34512; DE-AC03-86CS-30218)
Avail: Issuing Activity

The results of an experimental study designed to validate the dynamic distributed parameter model used in investigating the control of pump cycling in solar heating and cooling systems and the more general problem of liquid flow control in solar collector loops are given. The validation experiments consisted of first measuring the thermal time constants and transit times of the solar collector loop components. These time constants together with other system parameters and measured climatic data were used to predict the controller performance via the computer simulation model developed. The results of this simulation were compared to those obtained experimentally. The three experiments analyzed showed that the computer simulation was able to predict the controller performance well within the accuracy of the measured data. R.J.F.

N82-30651 Drexel Univ., Philadelphia, Pa.
COMPUTER SIMULATION FOR EVALUATING CONTROL STRATEGIES
S. J. Sokolowski (U.S. Army, Ft. Monmouth, N.J.), M. J. Fisher (U.S. Army, Ft. Monmouth, N.J.), P. R. Herczfeld, R. Fischl, and R. Wolfson (Middlebury College, Vt.) *In* ASME Solar Eng., 1981 1981 p 367-376 refs (For primary document see N82-30609 21-44)
(Contracts DE-ASQ2-77CS-34512; DE-AC03-86CS-30318)
Avail: Issuing Activity

A computer simulation code which accurately simulates the operation of solar energy systems under different control strategies such as either the on/off controller or the proportional flow controller is given. The salient feature of this simulation code is its accuracy since it continually updates a set of samples of the solution of the partial differential equation which represents the dynamic behavior of the solar system components. This approach avoids the simulation errors introduced by such methods as the finite differencing scheme which seem to influence the simulation results. The accuracy of the computer simulation was tested against both analytic expressions for the solar energy system performance and against experimental data. As an example of the utility of this simulation code, a comparison between the performance of on-off and proportional flow controls for different pump functions is given. R.J.F.

N82-30652 California Univ., San Diego, La Jolla. Energy Center.
ON ELIMINATING PEAK LOAD AUXILIARY ENERGY CONSUMPTION IN PASSIVE SOLAR RESIDENCES DURING WINTER
A. V. Sebald and D. Munoz (Inst. Technologico Regional de Tijuana, Baja Calif., Mexico) *In* ASME Solar Eng., 1981 1981

p 377-388 refs (For primary document see N82-30609 21-44) (Contract DE-AC04-79AL-10891)
Avail: Issuing Activity

The tradeoffs in properly controlled passive solar buildings when peak auxiliary energy consumption is to be avoided are examined. Computerized simulation analysis is used to determine how total backup consumption depends on the choice of peak load blackout periods, what comfort penalties arise, where off-peak energy should be introduced into the house, and the effects of imprecise short-term weather forecasts. R.J.F.

N82-30653 Michigan Technological Univ., Houghton. Dept. of Mechanical Engineering-Engineering Mechanics.
DATA DEPENDENT SYSTEMS APPROACH TO SOLAR ENERGY SIMULATION INPUTS
Sudhakar M. Pandit and Kamlakar P. Rajurkar *In* ASME Solar Eng., 1981 1981 p 389-398 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

An application of a recently developed methodology called data dependent systems (DDS) to modeling and analysis of solar insolation data is discussed. It is shown to be capable of combining the advantages of deterministic as well as stochastic models. Illustrative DDS models for Madison, Wisconsin data provide a comprehensive quantitative analysis of all the dynamic patterns, including some very minute ones. The model characteristics reveal the relation of these patterns to the direct and diffuse insolation as well as constant and variable weather dynamics. Major dynamic patterns are successfully reproduced in the data simulated with the help of only a few parameters and a random number generator. The relation of the dynamic patterns with a physical model is developed to show that a more realistic estimate of the extinction coefficient is obtained from the DDS models. R.J.F.

N82-30654 California Univ., San Diego, La Jolla. Energy Center.
A COMPARISON OF RADIANT INTERCHANGE ALGORITHMS
Joseph A. Carroll *In* ASME Solar Eng., 1981 1981 p 399-407 refs (For primary document see N82-30609 21-44) (Contract DE-AC02-80CS-30260)
Avail: Issuing Activity

A new algorithm for modeling radiant energy interchanges in rooms is compared to other algorithms. First the various methods are described and geometry-related errors are identified. Next other errors common to most of the methods are analyzed. Then the effect of these radiant interchange errors on simulation results is indicated. Tables show the magnitude of the errors associated with each method in a variety of test cases. R.J.F.

N82-30655 Midwest Research Inst., Golden, Colo. Building Systems Development Branch.
EFFECTS OF INTERNAL GAIN ASSUMPTIONS IN BUILDING ENERGY CALCULATIONS
Craig Christensen and Robert Perkins (Colorado Univ., Denver) *In* ASME Solar Eng., 1981 1981 p 408-414 refs Sponsored by DOE (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The utilization of direct solar gains in buildings can be affected by operating profiles, such as schedules for internal gains, thermostat controls, and ventilation rates. Building energy analysis methods use various assumptions about these profiles. The effects of typical internal gain assumptions in energy calculations. Heating and cooling loads from simulations using the Department of Energy 2.1 computer code are compared for various internal-gain inputs: typical hourly profiles, constant average profiles, and zero gain profiles. Prototype single-family-detached and multi-family-attached residential units are studied with various levels of insulation and infiltration. Small detached commercial buildings and attached zones in large commercial buildings are studied with various levels of internal gains. The results indicate that calculations of annual heating and cooling loads are sensitive to internal gains, but in most cases are relatively insensitive to hourly variations in internal gains. R.J.F.

N82-30656 California Univ., San Diego, La Jolla. Dept. of Applied Mechanics and Engineering Sciences.
ON EXTRACTING USEFUL BUILDING PERFORMANCE CHARACTERISTICS WITHOUT SIMULATION
A. V. Sebald and G. Vered *In* ASME Solar Eng., 1981 1981 p 415-423 refs (For primary document see N82-30609 21-44) (Contract DE-AC02-80CS-30260)
Avail: Issuing Activity

An alternative but complementary approach to the use of computerized simulation to extract information from a thermodynamic model is discussed. The model normally created for simulation is processed using Fourier Transforms to extract that structural information which can be obtained without simulation. More importantly, such information is not produced by simulations. Simple existing computer algorithms can be used to accomplish the necessary processing even for large models (approximately 40 nodes). The resulting structural information is useful both to determine whether building performance is satisfactory and to indicate solution paths when it is not. R.J.F.

N82-30657 Midwest Research Inst., Golden, Colo. Building Systems Development Branch.
SPECTRAL ANALYSIS OF AMBIENT WEATHER PATTERNS
J. V. Anderson and K. Subbarao *In* ASME Solar Eng., 1981 1981 p 424-430 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A Fourier spectral analysis of ambient weather data, consisting of global and direct solar radiation, dry and wet bulb temperatures, and wind speed, is given. By analyzing the heating and cooling seasons independently, seasonal variations are isolated and a cleaner spectrum emerges. This represents an improvement over previous work in this area, in which data for the entire year were analyzed together. As a demonstration of the efficacy of this method, synthetic data constructed with a small number of parameters are used in typical simulations, and the results are compared with those obtained with the original data. A spectral characterization of fluctuations around the moving average is given, and the changes in the fluctuation from season to season are examined. Author

N82-30658 Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
THE ECONOMIC FEASIBILITY OF FLAT-PLATE SOLAR HOT WATER SYSTEMS: RETROFIT APPLICATIONS FOR VIRGINIA PUBLIC BUILDINGS
Robert R. Somers, II, Alan C. Pritchard, Michael R. Sexton, Marcia C. Hoffman (Syska and Hennessy, Inc., Washington, D.C.), and Leroy S. Fletcher (Texas A & M Univ., College Station) *In* ASME Solar Eng., 1981 1981 p 431-438 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The results of an economic feasibility study of 177 public buildings in the Commonwealth of Virginia to determine if active flat-plate solar collector systems could economically augment or replace existing hot water heating installations are presented. The buildings which were examined included schools, hospitals, local government buildings, and public care facilities. Data concerning each facility's annual hot water requirements, 1978-79 energy costs, operating schedule, and location were evaluated using a computer program that could calculate the monthly and annual solar constribution to the hot water load for a given collector area. The program then performed a life-cycle costing of the solar system. A search technique was used in conjunction with these evaluations to determine two specific solar collector areas for each facility. The first collector area was elected by maximizing the present worth of the net savings over the life of the solar installation. This was designated the optimum collector area. The second collector area (the maximum area) was determined by maximizing the amount of solar energy that could be utilized without increasing the annual hot water system costs. The results indicate that there is a significant potential to use solar energy to provide hot water for many Virginia public buildings. R.J.F.

N82-30659 Science Applications, Inc., McLean, Va. Solar Technology Div.
THERMAL AND ECONOMIC ASSESSMENT OF HOT SIDE SENSIBLE HEAT AND COLD SIDE PHASE CHANGE STORAGE COMBINATION FO ABSORPTION SOLAR

COOLING SYSTEM
Michael K. Choi and Jeffrey H. Morehouse *In* ASME Solar Eng., 1981 1981 p 439-448 refs Sponsored in part by Midwest Research Inst. (For primary document see N82-30609 21-44)
Avail: Issuing Activity

An analysis of a solar assisted absorption cooling system which employs a combination of phase change on the cold side and sensible heat storage on the hot side of the cooling machine for small commercial buildings is given. The year-round thermal performance of this system for space cooling were determined by simulation and compared against conventional cooling systems in three geographic locations: Phoenix, Arizona; Miami, Florida and Washington, D.C. The results indicate that the hot-cold storage combination has a considerable amount of energy and economical savings over hot side sensible heat storage. Using the hot-cold storage combination, the optimum collector areas for Washington, D.C., Phoenix and Miami are 355 m squared, 250 m squared and 495 m squared, respectively. Compared against conventional vapor compression chiller, the net solar fractions are 61, 67 and 69 percent, respectively. R.J.F.

N82-30660 Michigan Univ., Ann Arbor. Dept. of Mechanical Engineering and Applied Mechanics.
A GENERALIZED ANALYSIS OF SOLAR SPACE HEATING
John A. Clark *In* ASME Solar Eng., 1981 1981 p 449-457 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A life-cycle model is developed for solar space heating within the United States. The model consists of an analytical relationship among five dimensionless parameters that include all pertinent technical, climatological, solar, operating and economic factors that influence the performance of a solar space heating system. An important optimum condition presented is the break-even metered cost of conventional fuel at which the cost of the solar system is equal to that of a conventional heating system. The effect of Federal (1980) and State (1979) income tax credits on these costs is determined. A parameter that includes both solar availability and solar system utilization is derived and plotted on a map of the U.S. This parameter shows the most favorable present locations for solar space heating application to be in the Central and Mountain States. The data employed are related to the rehabilitated solar data recently made available by the National Climatic Center. R.J.F.

N82-30661 University of Central Florida, Orlando. Dept. of Engineering.
ECONOMICS OF SOLAR ENERGY: SHORT TERM COSTING
Harold Klee *In* ASME Solar Eng., 1981 1981 p 458-464 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The solar economics based on life cycle costs are refuted as both imaginary and irrelevant. It is argued that predicting rates of inflation and fuel escalation, expected life, maintenance costs, and legislation over the next ten to twenty years is pure guesswork. Furthermore, given the high mobility level of the U.S. population, the average consumer is skeptical of long run arguments which will pay returns only to the next owners. In the short term cost analysis, the house is sold prior to the end of the expected life of the system. The cash flow of the seller and buyer are considered. All the relevant factors, including the federal tax credit and the added value of the house because of the solar system are included. M.G.

N82-30662 Mueller Associates, Inc., Baltimore, Md.
AN ECONOMIC COMPARISON OF ACTIVE SOLAR ENERGY AND CONVENTIONAL FUELS FOR WATER AND SPACE HEATING
Jefferson G. Shingleton and Thomas A. King *In* ASME Solar Eng., 1981 1981 p 465-474 Sponsored by DOE. Prepared in cooperation with Argonne National Lab., Ill.) (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The economic considerations involved in the decision to buy a solar energy system are discussed. In addition, a realistic evaluation is presented of the current cost effectiveness of solar water and space heating systems in all regions of the country and under various economic conditions based on the best available information. A reference long term economic scenario and several typical systems were used as the basis for the analyses. The sensitivity of the results to differences from the reference case is described. A series of reports produced for the U.S. Department of Energy is summarized. All results are not provided for each application type against each type of conventional fuel. However, sufficient results are presented to obtain an understanding of the extent to which solar water and space heating applications compete with conventional fuels. M.G.

N82-30663 Booz-Allen and Hamilton, Inc., Washington, D. C.
EFFECTS OF THE PROVISIONS OF THE CORPORATE AND PERSONAL INCOME TAX CODES ON SOLAR INVESTMENT DECISIONS
Michael R. Sedmak *In* ASME Solar Eng., 1981 1981 p 475-484 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The effects of the provisions of the existing corporate and personal income tax codes on solar investment decisions are analyzed. It is shown that the provisions of a tax code do not discriminate against investment in solar technologies if the present value of depreciation and interest expense tax deductions over the relevant decision period is equal to the present value of actual capital expenses. However, on the basis of a quantitative analyses, it is concluded that the existing corporate income tax code does discriminate against solar investments for the majority of corporations, although the 25 percent tax credit available to businesses for solar investments is sufficient to alleviate the distortion in most cases. In contrast, the provisions of the existing personal income tax code favor solar investments over investments in less capital intensive energy generating units, as the interest paid on loads used to finance solar investments made by individuals is tax deductible, while conventional fuel expenses are not deductible. M.G.

N82-30664 Department of Energy, Washington, D. C.
A COMPARISON OF FUEL SAVINGS IN THE RESIDENTIAL AND COMMERCIAL SECTORS GENERATED BY THE INSTALLATION OF SOLAR HEATING AND COOLING SYSTEMS UNDER THREE TAX CREDIT SCENARIOS
Robert Moden *In* ASME Solar Eng., 1981 1981 p 485-493 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

An analysis of expected energy savings between 1977 and 1980 under three different solar tax credit scenarios is presented. The results were obtained through the solar heating and cooling of buildings (SHACOB) commercialization model. This simulation provides projected savings of conventional fuels through the installation of solar heating and cooling systems on buildings in the residential and commercial sectors. The three scenarios analyzed considered the tax credits contained in the Windfall Profits Tax of April 1980, the National Tax Act of November 1978, and a case where no tax credit is in effect. M.G.

N82-30665 Midwest Research Inst., Golden, Colo. Solar Energy Program Branch.
SOLAR THERMAL COST GOALS
R. B. Edelstein *In* ASME Solar Eng., 1981 1981 p 495-502 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The development of cost goals for the DOE solar thermal program by the solar thermal cost goals committee (STCGC) is described. The objective of the STCGC is to determine a consistent set of time-related cost and performance goals for concentrating collector systems based on market value and intermediate goals based on attainable cost levels. Accomplishments thus far include: definition on cost goals and their function in program planning, delineation of competing energy systems costs, development of a breakeven costing methodology for assessing market value, determination of attainable costs for solar thermal systems, setting financial and economic parameters, and calculation of market value as a function of each competing fuel type, application, and region. Author

N82-30666 Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
SIMULATION AND ECONOMIC ANALYSIS OF A LIQUID-

BASED SOLAR SYSTEM WITH A DIRECT-CONTACT LIQUID-LIQUID HEAT EXCHANGER, IN COMPARISON TO A SYSTEM WITH A CONVENTIONAL HEAT EXCHANGER

P. Brothers and S. Karaki *In* ASME Solar Eng., 1981 1981 p 503-508 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Using a solar computer simulation package called TRNSYS, simulations of the direct contact liquid-liquid heat exchanger (DCLLHE) solar system and a system with conventional shell-and-tube heat exchanger were developed, based in part on performance measurements of the actual systems. The two systems were simulated over a full year on an hour-by-hour basis at five locations: Boston, Massachusetts, Charleston, South Carolina, Dodge City, Kansas, Madison, Wisconsin, and Phoenix, Arizona. Typically the direct-contact system supplies slightly more heat for domestic hot water and space heating in all locations and about 5 percentage points more cooling as compared to the conventional system. Using a common set of economic parameters and the appropriate federal and state income tax credits, as well as property tax legislation for solar systems in the corresponding states, the results of the study indicate for heating-only systems, the DCLLHE system has a slight life-cycle cost disadvantage compared to the conventional system. For combined solar heating and cooling systems, the DCLLHE has a slight life-cycle cost advantage which varies with location and amounts to one to three percent difference from the conventional system. M.G.

N82-30667 Tulane Univ., New Orleans, La. Dept. of Mechanical Engineering.

ECONOMIC ANALYSIS OF SOLAR BUILDING COMPONENTS

Kamal-Eldin Hassan (Al-Fateh Univ., Tripoli, Libya) *In* ASME Solar Eng., 1981 1981 p 509-514 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The problem of the economic choice of building materials and air conditioning equipment, solar and conventional, is dealt with. The formulation is particularly suitable for buildings with combined passive and positive indoor temperature control. The heat fluxes through the various components of the building are the thermal criteria used. The various costs are analyzed and separated into fixed (or capital) costs, and operating costs which constitute the total annual cost. This latter cost is the objective function to be minimized to give the optimum design. The problem is formulated in a most general dimensionless form. It is simplified by neglecting the effect on the total annual cost of the difference between the peak and average heat fluxes, which is negligible in most cases. The simplified relation is solved in closed form to optimize a single layer or two layers of a composite building component. An example of the results is presented graphically. Author

N82-30668 Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

VALUE ANALYSIS OF WIND ENERGY SYSTEMS TO ELECTRIC UTILITIES

David Percival and Jim Harper *In* ASME Solar Eng., 1981 1981 p 515-522 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A method was developed for determining the value of utility-operated wind energy systems to electric utilities. The analysis is performed by a package of computer models that interface with most conventional utility planning models. Weather data are converted to wind turbine output powers, which are used to modify the utility load representation. Execution of the utility planning models with both the original and modified load representation yields the gross and marginal value ($/rated kW) of the added wind energy systems. This value is then compared with cost estimates to determine if for economic reasons the wind energy systems should be included in future generation plans. M.G.

N82-30669 Drexel Univ., Philadelphia, Pa. Dept. of Electrical and Computer Engineering.

OPERATING A DISTRIBUTED PHOTOVOLTAIC POWER GENERATION SYSTEM AT A RESIDENTIAL SITE

T. F. Halpin, R. Fischl, and P. R. Herczfeld *In* ASME Solar Eng., 1981 1981 p 523-531 refs Sponsored in part by the Middle Atlantic Committee on Power Engineering Education (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A method and an inexpensive experiment for designing a photovoltaic electric power generating system located at a residential or commercial user's site which complements the utility's electric supply and is designed to be cost effective for the utility as well as the user are described. The integrated solar-utility electric (ISUE) energy system consists of a solar cell array, battery storage, and a load management strategy. The design is based on probabilistic performance indices which measure the probability of solar energy utilization and the probability of using utility power during peak periods. Experimental data on the effect of solar cell array size and energy management strategies on these performance indices were obtained using an inexpensive ISUE simulator which was installed at a residence. The results give the tradeoffs required in the design and the operating problem encountered when installing such a photovoltaic ISUE system. M.G.

N82-30670 Grumman Aerospace Corp., Bethpage, N.Y. Research Dept.

COST ANALYSIS OF DAWT INNOVATIVE WIND ENERGY SYSTEMS

K. M. Foreman *In* ASME Solar Eng., 1981 1981 p 532-540 refs Sponsored in part by Midwest Research Inst. (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The results of a diffuser augmented wind turbine (DAWT) preliminary design study of three constructional material approaches and cost analysis of DAWT electrical energy generation are presented. Costs are estimated assuming a limited production run (100 to 500 units) of factory-built subassemblies and on-site final assembly and erection within 200 miles of regional production centers. It is concluded that with the DAWT the (busbar) cost of electricity (COE) can range between 2.0 and 3.5 cents/kW-hr for farm and REA cooperative end users, for sites with annual average wind speeds of 16 and 12 mph respectively, and 150 kW rated units. No tax credit incentives are included in these figures. For commercial end users of the same units and site characteristics, the COE ranges between 4.0 and 6.5 cents/kW-hr. M.G.

N82-30671 Ford Aerospace and Communications Corp., Newport Beach, Calif. Aeronutronic Div.

BUFFER THERMAL ENERGY STORAGE FOR A SOLAR THERMAL POWERED 1-MW SUB e ELECTRICAL PLANT

R. E. Polzien *In* ASME Solar Eng., 1981 1981 p 541-548 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The application of a latent heat thermal energy buffer storage (TEBS) subsystem to the small community solar thermal power experiment (SCSE) is discussed. The SCSE is a 1-MW sub e solar thermal electric plant consisting of multiple paraboloidal concentrators with an organic Rankine cycle power conversion unit mounted at the focus of each concentrator. Objective of the TEBS is to minimize plant shutdowns during intermittent cloud coverage thereby improving life expectancy of major subsystems. An SCSE plant performance model is used with time varying insolation to show that 70 to 80 percent of the potential engine shutdowns may be averted with the TEBS system. Parametric variation of engine life dependency on start/stop cycles shows the potential for a 4 percent reduction in levelized bus bar energy cost using TEBS. M.G.

N82-30672 Ford Aerospace and Communications Corp., Newport Beach, Calif. Aeronutronic Div.

ECONOMIC ANALYSIS OF A DISH-RANKINE SOLAR THERMAL POWER SYSTEM

R. L. Pons and R. E. Irwin *In* ASME Solar Eng., 1981 1981 p 549-556 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

An analysis of the performance and costs of a first generation dish Rankine solar thermal power system for small community and industrial applications is presented. The system is of the point-focusing distributed receiver type, with distributed generation

and employs multiple paraboloidal concentrators with organic Rankine cycle power conversion systems at the focus of each dish. Projected life cycle energy costs for a fully developed and mass produced system are shown to be competitive with costs projected in the near future for electricity generated by more conventional means. It is shown that: (1) the method of rating plant poer output has a minor influence on life cycle energy cost, (2) optimum dish size is greater than 12m, (3) energy cost is virtually independent of plant size above 1 MW sub e and (4) dish spacing and geometric arrangement can be optimized to reduce energy cost. M.G.

N82-30673 Lincoln Lab., Mass. Inst. of Tech., Lexington.
PERFORMANCE OF A COMBINED PHOTOVOLTAIC/THERMAL, FLAT-PLATE, LIQUID COLLECTOR
W. A. Aiello and P. Raghuraman *In* ASME Solar Eng., 1981 1981 p 557-564 refs Sponsored in part by DOE (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A combined photovoltaic/thermal, flat-plate, liquid collector, where the liquid circulates both below and above the photovoltaic cells (the primary energy-absorbing surface), was designed and tested according to ASHRAE 93-77 specifications to yield collector thermal and electrical efficiencies. A one-dimensional thermal analysis predicts the test results accurately. On the strength of the test and analytical results, design recommendations are made to maximize the total energy extracted from the collectors. M.G.

N82-30674 Alabama Univ., Huntsville. Solar Energy Center.
TESTING AND EVALUATION OF Btu METERS USED FOR MEASURING SOLAR SYSTEM PERFORMANCE
Gerald R. Guinn and Leigh L. Hummer *In* ASME Solar Eng., 1981 1981 p 565-571 ref (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The operational experience and calibration results of three makes of meters which are widely used as primary instrumentation on active solar energy systems are described. Btu (heat) meters are widely utilized as a utility metering device and as a low cost instrument for evaluating performance of solar energy systems. Approximately 35 Btu meters were tested prior to installation in active solar DWH systems under evaluation. It is indicated that the meter are capable to measure water volume and Btu's at flow rates typically found in solar systems. E.A.K.

N82-30675 Massachusetts Inst. of Tech., Cambridge. Energy Lab.
STANDARDS, WARRANTIES, AND COMMERCIALIZATION OF NEW ENERGY TECHNOLOGIES
Drew Bottaro *In* ASME Solar Eng., 1981 1981 p 572-580 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The functions of standards for solar technologies and the economic effects which standards have upon markets are described. Three types of effects are discussed: upon demand for products using the technology, upon cost, and upon the market structure and competitive behavior of the industries producing the products. E.A.K.

N82-30676 Tennessee Valley Authority, Chattanooga. Technical Support Section.
RESULTS OF ASHRAE 95 THERMAL TESTING OF 32 RESIDENTIAL SOLAR WATER HEATING SYSTEMS
Glenn T. Chinery and Francis C. Wessling, Jr. *In* ASME Solar Eng., 1981 1981 p 581-588 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Thermal testing for 32 residential solar water heating systems that are presented with system descriptions and a review of the test methodology. The tested systems included drain back, drain down, closed loop and air designs and utilized water, glycol/water mixtures, silicone oil and air heat transfer fluids. Systems tested included one and two tank designs. Collectors comprised of selective and nonselective surfaces. The system energy multipliers ranged from 0.96 to 3.6 and calculated fractional energy savings ranged from 17% to 78%. E.A.K.

N82-30677 Utah Univ., Salt Lake City.
TESTING OF AIR-FLOW WINDOWS FOR EVALUATION AND APPLICATION
R. F. Boehm and K. Brandle *In* ASME Solar Eng., 1981 1981 p 589-596 refs Prepared in cooperation with California Univ., Berkeley. Lawrence Berkeley Lab. Sponsored in part by DOE and HUD (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The performance of air flow windows was assessed and compared to a conventional window of current design. Tests are quite representative of actual application conditions in a variety of vertical orientations. The actual application condition requirement necessitated some approximations to the energy measurements which are not found in guarded hot box or calorimeter kines of approaches to performance evaluations. The testing technique and required aproximations are described. A possible type of solar residential application is also described. E.A.K.

N82-30678 Stevens Inst. of Tech., Hoboken, N. J.
THE STEVENS-LEVOLOR ENVIRONMENTAL SIMULATOR AND THE STUDY OF INTERIOR SHADING FOR ENERGY EFFICIENT WINDOWS
R. L. VanDyck and T. P. Konen *In* ASME Solar Eng., 1981 1981 p 597-609 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A window systems and experiments in a unique environmental simulator with an artificial sun were tested. It is shown that interior venetian blind shading is an effective window energy management technique. Predictive methods of generating shading coefficients applicable to modern venetian blinds is confirmed. The findings indicating light colored, as well as highly reflective blinds yielded as significant energy savings. E.A.K.

N82-30679 Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Energy Systems Div.
AN EVALUATION OF LIGHTWEIGHT CONCRETE VESSELS FOR THERMAL ENERGY STORAGE
Gerard G. Elia and R. W. Buckman, Jr. *In* ASME Solar Eng., 1981 1981 p 610-615 refs (For primary document see N82-30609 21-44)
(Contract EM-78-C-02-47003)
Avail: Issuing Activity

Lightweight concrete vessels for thermal energy storage were tested. A hot water storge system made with precast or cast on site lightweight concrete capable of easy assembly and integration with residential or other structures was developed. The predicted and measured thermal behavior (heat loss) of the vessels is compared. A temperature decay test to measure vessel heat loss is also developed. E.A.K.

N82-30680 California State Univ., Sacramento. Dept. of Physics.
COOLING PERFORMANCE DATA AND ANALYSIS FOR THREE PASSIVE/HYBRID HOMES IN DAVIS, CALIFORNIA
Sukhbir Mahajan, Charles Newcomb, Michael Shea, Dale Woodford, Edward Hodapp, and William Armes *In* ASME Solar Eng., 1981 1981 p 616-625 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Three passive/hybrid homes in California, were monitored continuously during the summer of 1979. Two of the houses, are purely passive type, with water columns and concrete floors providing the thermal mass. The third house is a hybrid type. It transfers energy by forced air flow to a rock bed under the slab floor. All three houses are cooled by cooldown of building mass by night ventilation. Hourly data on air temperature, globe temperature, thermal mass temperatures and ambient air temperature were collected. The strip chart data were transferred to magnetic tapes for digital analysis. Thermal performance simulations for all three houses were made by computer codes. The experimentally measured air and thermal mass temperatures, and auxiliary cooling energy used are compared with the computer code predictions. E.A.K.

N82-30681 Delaware Univ., Newark. Inst. of Energy Conversion.

MEASUREMENT OF THE HEAT TRANSFER RATE FOR THERMAL ENERGY STORAGE MASSES IN DIRECT GAIN PASSIVE SOLAR HEATING SYSTEMS

Stuart F. Faunce and Russell K. Rickert (West Chester State College, Pa.) *In* ASME Solar Eng., 1981 1981 p 626-631 refs (For primary document see N82-30609 21-44)

Avail: Issuing Activity

The measurement of heat transfer and the amount of thermal energy stored in thermal mass used in a passive solar heating system is described. A thermal flux meter measured the rate of heat transfer. A time relationship for the solar energy absorbed and discharged by the mass was obtained. Different orientations of the irradiated surface which consisted of different materials such as brick, concrete and phase change materials were measured. Measurements for various mass composites give values of heat transfer for absorptive of the solar irradiated surface for horizontally oriented masses and for the same masses in a vertical position. E.A.K.

N82-30682 Babcock and Wilcox Co., Barberton, Ohio. Fossil Power Generation Div.

THERMAL ANALYSIS OF A SOLAR ADVANCED WATER/STEAM RECEIVER

L. T. Yeh and M. Wiener *In* ASME Solar Eng., 1981 1981 p 632-641 refs Sponsored in part by Sandia Labs. (For primary document see N82-30609 21-44)

(Contract AT(29-1)-789)

Avail: Issuing Activity

A conceptual design for a 100 MWe solar advanced water/steam receiver that is cost effective and will perform within a practical and reliable power generation system was developed. The design requirements and the basic features of a novel receiver are described. The methods used to estimate the receiver's thermal losses and thermal efficiency are described. The receiver is external with screen tubes using a forced recirculation system. Effects due to changing conditions, such as ambient temperature and wind speed, and changes of solar incident power are presented. The maximum tube metal temperature and the safety factor which is the ratio of maximum allowable heat flux to the actual heat flux absorbed are computed. E.A.K.

N82-30683* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE APPLICATION OF SIMULATION MODELING TO THE COST AND PERFORMANCE RANKING OF SOLAR THERMAL POWER PLANTS

Leigh S. Rosenberg, William R. Revere, and M. Kudret Selcuk *In* ASME Solar Eng., 1981 1981 p 642-653 refs Sponsored in part by DOE in agreement with NASA (For primary document see N82-30609 21-44)

Avail: Issuing Activity CSCL 10B

Small solar thermal power systems (up to 10 MWe in size) were tested. The solar thermal power plant ranking study was performed to aid in experiment activity and support decisions for the selection of the most appropriate technological approach. The cost and performance were determined for insolation conditions by utilizing the Solar Energy Simulation computer code (SESII). This model optimizes the size of the collector field and energy storage subsystem for given engine generator and energy transport characteristics. The development of the simulation tool, its operation, and the results achieved from the analysis are discussed. E.A.K.

N82-30684* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

HEAT ENGINE DEVELOPMENT FOR SOLAR THERMAL POWER SYSTEMS

H. Q. Pham and L. D. Jaffe *In* ASME Solar Eng., 1981 1981 p 654-659 refs Sponsored in part by DOE in Agreement with NASA (For primary document see N82-30609 21-44)

Avail: Issuing Activity CSCL 10B

The parabolic dish solar collector systems for converting sunlight to electrical power through a heat engine will, require a small heat engine of high performance long lifetime to be competitive with conventional power systems. The most promising engine candidates are Stirling, high temperature Brayton, and combined cycle. Engines available in the current market today do not meet these requirements. The development of Stirling and high temperature Brayton for automotive applications was studied which utilizes much of the technology developed in this automotive program for solar power engines. The technical status of the engine candidates is reviewed and the components that may additional development to meet solar thermal system requirements are identified. E.A.K.

N82-30685 Montreal Univ. (Quebec). Dept. of Mechanical and Engineering.

OPTIMIZING THE PERFORMANCE OF A SOLAR LIQUID PISTON PUMP

C. L. Murphy *In* ASME Solar Eng., 1981 1981 p 660-666 refs Sponsored in part by a grant from NSERC (For primary document see N82-30609 21-44)

Utilization of solar energy for pumping water for irrigation or storage is discussed. Oscillations of a Freon 113 liquid column are generated in a working tube when a continuous flow of hot water, and cooling water, are supplied to heated and cooling coils located in the tube. The oscillations are converted into a pump (SLPP) model exhibited self starting, stable operation over a wide range of conditions, provides the inlet hot water heat source and inlet cooling water heat sink are above and below the critical values for stalling at a given pump head. The operation of the SLPP model, is primarily affected by the heating coil position within the working tube, and the geometries of the inlet and outlet water tubes. E.A.K.

N82-30686* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

METAL-HALIDE MIXTURES FOR LATENT HEAT ENERGY STORAGE

K. Chen and R. Manvi *In* ASME Solar Eng., 1981 1981 p 667-674 refs Sponsored in part by DOE in agreement with NASA (For primary document see N82-30609 21-44)

Avail: Issuing Activity CSCL 10C

Some candidates for alkali metal and alkali halide mixtures suitable for thermal energy storage at temperatures > 600 C are identified. A solar thermal system application which offer advantages such as precipitation of salt crystals away from heat transfer surfaces, increased thermal conductivity of phase change materials, corrosion inhibition, and a constant monotectic temperature, independent of mixture concentrations. By using the lighters, metal rich phase as a heat transfer medium and the denser, salt rich phase as a phase change material for latent heat storage, undesirable solidification on the heat transfer surface may be prevented, is presented. E.A.K.

N82-30687 Sandia Labs., Albuquerque, N. Mex. Fluid Mechanics and Heat Transfer Div.

SIMULATOR OF LARGE THERMAL ENERGY SYSTEMS (SOLTES)

Norman R. Grandjean and Merton E. Fewell *In* ASME Solar Eng., 1981 1981 p 675-678 refs (For primary document see N82-30609 21-44)

(Contract DE-AC04-76DP-00789)

Avail: Issuing Activity

SOLTES simulates the steady-state response of thermal energy systems to time-varying data such as weather and loads. Thermal energy system models of individual components and simple and complex systems can easily be modularly constructed from a library of routines. These routines mathematically model solar collectors, pumps, switches, thermal energy storage, thermal boilers, auxiliary boilers, heat exchangers, extraction turbines, extraction turbine/generators, condensers, regenerative heaters, air conditioners, process vapor, etc.; SOLTES also allows user-supplied routines. Model construction is a natural extension of the system analyst's schematic. A pre-processor aids the user in constructing and editing system models and automatically constructs a SOLTES program that uses only those routines in the system model; thus, computer core requirements are minimized. N.W.

N82-30688 California Univ., Livermore. Lawrence Livermore Lab.

THE ROLE OF FINANCING IN THE MARKETABILITY OF CAPITAL INTENSIVE SOLAR TECHNOLOGIES FOR INDUSTRY

William C. Dickinson *In* ASME Solar Eng., 1981 1981

p 679-687 ref (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Three methods of financing large, capital-intensive, industrial solar systems are examined: conventional end-user financing; conventional lease financing; and the solar management company/limited partnership (SMC). The primary disadvantage of the first method is the large capital investment required of the end-user. The availability of investment capital is limited and other investment priorities usually are dominant. In the latter two methods the end-user is not required to provide any front-end capital. The SMC structure appears particularly attractive in that the end-user pays only for solar energy delivered to the process and is not required to operate and maintain the system. Author

N82-30689 Arizona Univ., Tucson. Dept. of Nuclear and Energy Engineering.
DESIGN AND ECONOMIC ANALYSIS FOR SOLAR PROCESS HEAT
G. V. Mignon, L. Compoy, F. Luttmann, and R. Fazzolare *In* ASME Solar Eng., 1981 1981 p 688-693 refs Sponsored in part by Arizona Solar Energy Research Commission (For primary document see N82-30609 21-44)
Avail: Issuing Activity

A general methodology for the analysis of solar industrial process heat design is described. In the analysis a number of factors must be considered such as climate, plant location and environment, displaced fuel, process demand and schedule, equipment and component alternatives, and system cost. The system parameters are optimized for an assumed set of economic conditions. The results of the analysis are: technical and economic feasibility indicators, collector field design, thermal storage size, pumping and heat exchanger requirements. Author

N82-30690 Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
THE VALUE OF THERMAL STORAGE IN SOLAR IPH SYSTEMS
S. M. Hock and M. E. Karpuk *In* ASME Solar Eng., 1981 1981 p 696-701 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The value of thermal storage for three solar industrial process heat systems was determined for storage capacities of 3 to 4000 hours. The dominant source of storage value is backup fuel savings with additional value derived from increased capital equipment utilization and elimination. A computer simulation was used to model the operation of the solar IPH system and predict the amount of fuel saved by heat delivered from storage. Sensitivity of storage value to process temperature, collector cost, load profile, insolation and storage efficiency have been calculated. Storage values ranged from near zero to as high as $42 per Kw-hr of storage capacity. Author

N82-30691 Los Alamos Scientific Lab., N. Mex.
CONCENTRATING SOLAR COLLECTOR SYSTEM FOR THE EVAPORATION OF LOW-LEVEL RADIOACTIVE WASTE WATER
Stephen C. Diamond and Charlene C. Cappiello *In* ASME Solar Eng., 1981 1981 p 702-707 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Performance optimization of collector array size and configuration, storage medium and capacity, system operation, and control schemes are done using the active solar system simulator in the DOE-2 building energy analysis computer program. Results of this optimization are reported. Author

N82-30692 ECA, Inc., Woodridge, Ill.
CALCIUM CARBONATE SCALING IN SOLAR COLLECTORS
I. Singh, C. F. Cheng, and R. M. Wolosewicz (Argonne National Lab.) *In* ASME Solar Eng., 1981 1981 p 708-711 refs Sponsored in part by DOE (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Water samples collected from five U.S. Department of Energy sponsored solar energy systems and eight water samples of varying degrees of hardness were assessed for tendency to form calcium carbonate scale on solar collector surfaces. A two-step approach is recommended for estimating scaling potential based on water analysis: (1) calculate the Palin Index, and (2) if the index shows a potential for scaling, confirm this result by using the method developed at Argonne National Laboratory based on the Caldwell-Lawrence approach. Water treatments for preventing scaling also are discussed. Author

N82-30693 Sandia Labs., Albuquerque, N. Mex.
A FIRST AND SECOND LAW ANALYSIS OF STEAM STEADILY FLOWING THROUGH CONSTANT DIAMETER PIPES
M. E. Fewell *In* ASME Solar Eng., 1981 1981 p 712-718 refs (For primary document see N82-30609 21-44)
(Contract DE-AC04-76DP-00789)
Avail: Issuing Activity

A mathematical model for the steady flow of subcritical, superheated steam through constant diameter pipes is discussed. The model numerically integrates a set of three simultaneous, first order, ordinary differential equations that include the pressure drop due to friction, elevation changes, and acceleration; thermal effects on the fluid properties. The irreversibility due to thermal losses and pressure drop is calculated so that the loss in the ability to produce useful work is determined. This model may be used to design piping for power conversion systems. Author

N82-30694 Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
WIND LOADING ON TRACKING AND FIELD MOUNTED SOLAR COLLECTORS
L. M. Murphy *In* ASME Solar Eng., 1981 1981 p 719-727 refs Sponsored in part by DOE (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Current design and testing procedures for wind loading are discussed. The test results corresponding to numerous wind tests on heliostats, parabolic troughs, parabolic dishes, and field mounted photovoltaic arrays are discussed and the applicability of the findings across the various technologies is assessed. Author

N82-30695 ECA, Inc., Woodridge, Ill. Alternative Energy Technologies.
CORROSION PROBLEMS ASSOCIATED WITH SOLAR FLUID AND COMPONENTS
C. F. Cheng, C. P. Chen, and R. M. Wolosewicz (Argonne National Lab., Ill.) *In* ASME Solar Eng., 1981 1981 p 728-738 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Corrosion and materials problems encountered at three commercial solar demonstration sites are discussed, including analyses of failed outer/inner glass cover plates, absorber panels/tubes, collector outlet tubes, interconnecting hoses, heat exchangers, and storage tanks. In addition, preliminary results are reported of laboratory tests on the corrosion of carbon steel, copper, and aluminum in inhibited propylene-glycol solutions at temperatures typical of stagnant-full conditions (352 F or 178 C). Author

N82-30696 Rensselaer Polytechnic Inst., Troy, N. Y.
COMPUTER SIMULATION OF A PASSIVE SOLAR ASSISTED HEAT PUMP
David Kinlock, Norman Hinesey, and John Tichy *In* ASME Solar Eng., 1981 1981 p 739-745 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The Passive Solar Assisted Heat Pump (PSAHP) consists of the outdoor heat exchanger of a conventional air-to-air heat pump enclosed in an attached passive solar greenhouse. A computer simulation of this concept was developed to determine if it worked to optimize the design and to check the effect of various parameters on system operation. An hour-by-hour simulation using weather data for the albany, New York area was used, as typical of the severe Northeast U.S. climate region. The optimum design offered a 24% electric energy savings over a regular heat pump. Author

N82-30697 Midwest Energy Inst., Kansas City, Mo.
THERMAL PERFORMANCE OF LOW-COST RETROFITTED SOLAR SPACE HEATING SYSTEM
Jon Slote *In* ASME Solar Eng., 1981 1981 p 746-754 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

The thermal performance of 10 similar low cost, shop built, south wall, active air solar space heating systems is evaluated for 10 days of the 1979 to 80 heating season. The design of the system is outlined. In addition, the equipment and procedures used to monitor the system are detailed, and several practical problems encountered designs of the individual systems, with the consistent features of the more successful systems receiving special attention. J.D.

N82-30698 Argonne National Lab., Ill.
RELIABILITY ASSESSMENT OF SOLAR DOMESTIC HOT WATER SYSTEMS
P. Y. Wang and R. M. Wolosewicz *In* ASME Solar Eng., 1981 1981 p 755-761 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Reliability and mean time between failure studies of six generic solar domestic hot water systems are presented. Failure rate data for system components were obtained from product literature or from consumer product industries. Reliability block diagrams are employed for the analyses, and exponential distribution functions are assumed for individual components. Since some components do not operate continuously, a duty-cycle factor is developed and defined as the ratio of operating time to total mission time. To accommodate systems experiencing different duty cycles, an averaged duty cycle is introduced to estimate mean lives. Large variations in system reliability and mean life were found and result from wide failure rate bands for some of the components. Author

N82-30699 Vitro Labs., Silver Spring, Md.
VALIDATION OF REMOTELY SENSED DATA FROM A LARGE NETWORK OF SOLAR HEATING AND COOLING INSTALLATIONS
C. J. Kelly, Jr. *In* ASME Solar Eng., 1981 1981 p 762-769 refs (For primary document see N82-30609 21-44)
Avail: Issuing Activity

Methods for ensuring that data reported by telephone from widely separated solar heating and cooling installations are accurate and reliable are discussed. These methods are divided into two phases-data screening and performance factor validation. Performance factors are the numerical results of performance evaluations of the individual installations. Data screening consists of determining that the gathered data are reasonable with regard to magnitude, rate of change and relationship to other sensor outputs. Performance factor validation consists of constructing energy balances using different groups of sensors or anaysis techniques and comparing the results. This validation does not verify individual sensor accuracy but rather confirms the energy flow calculations to standards which may vary fo each system. Using these methods, inaccurate or inoperable sensors can be discovered with a high degree of confidence. These validation methods are described and use of them on data gathered from a large scale data network is detailed with examples of the types of anomalies discovered. J.D.

N82-30700*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RESULTS OF CHOPPER-CONTROLLED DISCHARGE LIFE CYCLING STUDIES ON LEAD ACID BATTERIES
John G. Ewashinka and Steven M. Sidik 1982 17 p refs Presented at the 17th Intersoc. Energy Conversion Eng. Conf., Los Angeles, 8-13 Aug. 1982 Sponsored in part by DOE
(NASA-TM-82912; DOE/NASA/51044-26; E-1293; NAS 1.15:82912) Avail: NTIS HC A02/MF A01 CSCL 10C

A group of 108 state of the art nominally 6 volt lead acid batteries were tested in a program of one charge/discharge cycle per day for over two years or to ultimate battery failure. The primary objective was to determine battery cycle life as a function of depth of discharge (25 to 75 percent), chopper frequency (100 to 1000 Hz), duty cycle (25 to 87.5 percent), and average discharge current (20 to 260 A). The secondary objective was to determine the types of battery failure modes, if any, were due to the above parameters. The four parameters above were incorporated in a statistically designed test program. R.J.F.

N82-30701*# Cornell Univ., Ithaca, N. Y. Dept. of Materials Science and Engineering.
AN EBIC STUDY OF DISLOCATION NETWORKS IN UNPROCESSED AND UNPROCESSED WEB SILICON RIBBON
F. Sporon Fieldler (Hewlett-Packard Co., Covallis, Oreg.) and D. Ast May 1982 30 p refs Sponsored in part by DOE
(Contract JPL-956046)
(NASA-CR-169213; JPL-9950-687; DOE/JPL-956046-8272; NAS 1.26:169213; Rept-2) Avail: NTIS HC A03/MF A01 CSCL 10A

Experimental techniques for the preparation of electron beam induced current samples of Web-dentritic silicon are described. Both as grown and processed material were investigated. High density dislocation networks were found close to twin planes in the bulk of the material. The electrical activity of these networks is reduced in processed material. S.L.

N82-30702*# Science Applications, Inc., La Jolla, Calif.
SOLAR THERMAL BENEFITS STUDY. TASK 1: UTILITY CASE STUDIES
S. Young Mar. 1982 95 p refs Prepared for JPL
(NASA-CR-169245; NAS 1.26:169245) Avail: NTIS HC A05/MF A01 CSCL 10A

Metrodology, solar systems, utility systems, fuel and economic assumptions, solar system benefits, and remaining work are summarized with charts and tables. N.W.

N82-30703*# Springborn Labs., Inc., Enfield, Conn.
INVESTIGATION OF TEST METHODS, MATERIAL PROPERTIES, AND PROCESSES FOR SOLAR CELL ENCAPSULANTS
Quarterly Progress Report
P. B. Willis Apr. 1982 69 p
(Contract JPL-954527)
(NASA-CR-169239; DOE/JPL-954527-82/22; NAS 1.26:169239; QPR-23) Avail: NTIS HC A04/MF A01 CSCL 10A

Technical investigations concerned the development of advanced cure chemistries for lamination type pottants; the continued evaluation of soil resistant surface treatments, and the results of an accelerated aging test program for the comparison of material stabilities. New compounds were evaluated for efficiency in curing both ethylene/vinyl acetate and ethylene/methyl acrylate pottants intended for vacuum bag lamination of solar cells. One compound in particular, designated Lupersol - TBEC (Lucidol Division of Pennwalt Corp.) was found to be unusually effective in promoting the rapid cure of both these materials. Formulation of these resins with TBEC resulted in compositions of very high gel content, lower temperatures of activation, and much lower cure times, even in the ethylene/methyl acrylate polymer that is more difficult to cure. It is expected that TBEC modified pottant formulations may permit the lamination/encapsulation step to be operated at lower temperatures, higher speed, higher throughput and a much wider tolerance for intentional or accidental variations in the cure schedule. An experimental program continued to determine the effectiveness of soil resistant coatings. Author

N82-30704*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LEWIS PRESSURIZED, FLUIDIZED-BED COMBUSTION PROGRAM. DATA AND CALCULATED RESULTS
R. James Rollbuhler Mar. 1982 63 p refs
(NASA-TM-81767; E-830; NAS 1.15:81767) Avail: NTIS HC A04/MF A01 CSCL 10B

A 200 kilowatt (thermal), pressurized, fluidized bed (PFB) reactor and research test facility were designed, constructed, and operated. The facility was established to assess and evaluate the effect of PFB hot gas effluent on aircraft turbine engine materials that may have applications in stationary powerplant turbogenerators. The facility was intended for research and development work and was designed to operate over a wide range of conditions. These conditions included the type and rate of consumption of fuel (e.g., coal) and sulfur reacting sorbent

material: the ratio of feed fuel to sorbent material; the ratio of feed fuel to combustion airflow; the depth of the fluidized reaction bed; the temperature and pressure in the reaction bed; and the type of test unit that was exposed to the combustion exhaust gases. S.L.

N82-30705*# Engelhard Industries, Inc., Edison, N.J.
DEVELOPMENT AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEMS. PHASE 3: FULL-SCALE POWER PLANT DEVELOPMENT Quarterly Report, Nov. 1981 - Jan. 1982
A. Kaufman 21 Jun. 1982 61 p refs
(Contracts DEN3-241; DE-AI01-80ET-17088)
(NASA-CR-167898; DOE/NASA/0241-4; NAS 1.26:167898; QR-4) Avail: NTIS HC A04/MF A01 CSCL 10B

The on-site system application analysis is summarized. Preparations were completed for the first test of a full-sized single cell. Emphasis of the methanol fuel processor development program shifted toward the use of commercial shell-and-tube heat exchangers. An improved method for predicting the carbon-monoxide tolerance of anode catalysts is described. Other stack support areas reported include improved ABA bipolar plate bonding technology, improved electrical measurement techniques for specification-testing of stack components, and anodic corrosion behavior of carbon materials. Author

N82-30706*# Spire Corp., Bedford, Mass.
DEVELOPMENT OF A LARGE AREA SPACE SOLAR CELL ASSEMBLY Final Report, Jul. 1981 - Mar. 1982
M. B. Spitzer May 1982 65 p refs
(Contract NAS3-22236)
(NASA-CR-167929; NAS 1.26:167929; FR-10081) Avail: NTIS HC A04/MF A01 CSCL 10A

The development of a large area high efficiency solar cell assembly is described. The assembly consists of an ion implanted silicon solar cell and glass cover. The important attributes of fabrication are the use of a back surface field which is compatible with a back surface reflector, and integration of coverglass application and cell fabrications. Cell development experiments concerned optimization of ion implantation processing of 2 ohm-cm boron-doped silicon. Process parameters were selected based on these experiments and cells with area of 34.3 sq cm wre fabricated. The average AMO efficiency of the twenty-five best cells was 13.9% and the best bell had an efficiency of 14.4%. An important innovation in cell encapsulation was also developed. In this technique, the coverglass is applied before the cell is sawed to final size. The coverglass and cell are then sawed as a unit. In this way, the cost of the coverglass is reduced, since the tolerance on glass size is relaxed, and costly coverglass/cell alignment procedures are eliminated. Adhesive investigated were EVA, FEP-Teflon sheet and DC 93-500. Details of processing and results are reported. B.W.

N82-30707*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A SIMPLE MODEL OF PROTON DAMAGE IN GaAs SOLAR CELLS
John W. Wilson, Gilbert H. Walker, and R. A. Outlaw Jun. 1982 18 p refs
(NASA-TM-84495; NAS 1.15:84495) Avail: NTIS HC A02/MF A01 CSCL 10A

A simple proton damage model for GaAs solar cells is derived and compared to experimental values of change in short circuit currents. The recombination cross section associated with the defects was determined from the experimental comparison to be approximately 1.2 x 10 to the -13th power sq cm in fair agreement with values determined from the deep level transient spectroscopy technique. Author

N82-30708*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NECAP 4.1: NASA'S ENERGY-COST ANALYSIS PROGRAM INPUT MANUAL
Ronald N. Jensen May 1982 127 p
(NASA-TM-83239; NAS 1.15:83239) Avail: NTIS HC A07/MF A01 CSCL 10A

The computer program NECAP (NASA's Energy Cost Analysis Program) is described. The program is a versatile building design and energy analysis tool which has embodied within it state of the art techniques for performing thermal load calculations and energy use predictions. With the program, comparisons of building designs and operational alternatives for new or existing buildings can be made. The major feature of the program is the response factor technique for calculating the heat transfer through the building surfaces which accounts for the building's mass. The program expands the response factor technique into a space response factor to account for internal building temperature swings; this is extremely important in determining true building loads and energy consumption when internal temperatures are allowed to swing. R.J.F.

N82-30709*# Tanksley (W. L.) and Associates, Inc., Brook Park, Ohio.
VIBRATION ANALYSIS OF THREE GUYED TOWER DESIGNS FOR INTERMEDIATE SIZE WIND TURBINES
Robert J. Christie Mar. 1982 113 p refs
(Contract NAS3-21900)
(NASA-CR-165589; DOE/NASA/1900-1; NAS 1.26:165589) Avail: NTIS HC A06/MF A01 CSCL 10A

Three guyed tower designs were analyzed for intermediate size wind turbines. The four lowest natural frequencies of vibration of the three towers concepts were estimated. A parametric study was performed on each tower to determine the effect of varying such tower properties as the inertia and stiffness of the tower and guys, the inertia values of the nacelle and rotor, and the rotational speed of the rotor. Only the two lowest frequencies were in a range where they could be excited by the rotor blade passing frequencies. There two frequencies could be tuned by varying the guy stiffness, the guy attachment point on the tower, the tower and mass stiffness, and the nacelle/rotor/power train masses. Author

N82-30710*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIENCE AND ASSESSMENT OF THE DOE-NASA MOD-1 2000-KILOWATT WIND TURBINE GENERATOR AT BOONE, NORTH CAROLINA Final Report
John L. Collins, Richard K. Shaltenc, Richard H. Poor (General Electric, Philadelphia), and Robert S. Barton (General Electric, Philadelphia) Apr. 1982 55 p refs
(Contract DE-AI01-76ET-20366)
(NASA-TM-82721; E-1020; DOE/NASA/20366-2; NAS 1.15:82721) Avail: NTIS HC A04/MF A01 CSCL 10A

The Mod 1 program objectives are defined. The Mod 1 wind turbine is described. In addition to the steel blade operated on the wind turbine, a composite blade was designed and manufactured. During the early phase of the manufacturing cycle of Mod 1A configuration was designed that identified concepts such as partial span control, a soft tower, and upwind teetered rotors that were incorporated in second and third generation industry designs. The Mod 1 electrical system performed as designed, with voltage flicker characteristics within acceptable utility limits. Power output versus wind speed equaled or exceeded design predictions. The wind turbine control system was operated successfully at the site and remotely from the utility dispatcher's office. During wind turbine operations, television interference was experienced by the local residents. As a consequence, operations were restricted. Although not implemented, two potential solutions were identified. In addition to television interference, a few local residents complained bout objectionable sound, particularly the 'thump' as the blade passed behind the tower. To eliminate objections, the sound generation level was reduced by 10 dB by reducing the rotor speed from 35 rpm to 23 rpm. Bolts in the drive train fractured. A solution was identified but not implemented. The public reaction toward the Mod 1 wind turbine program was overwhelmingly favorable. S.L.

N82-30711*# Ionics, Inc., Watertown, Mass.
ANION PERMSELECTIVE MEMBRANE Summary Report
Russell B. Hodgdon and Warren A. Waite Apr. 1982 75 p
(Contracts DEN3-204; DE-AI04-80AL-12726)
(NASA-CR-167872; DOE/NASA/0204-1; NAS 1.26:167872) Avail: NTIS HC A04/MF A01 CSCL 10A

The synthesis and fabrication of polymeric anion permselective membranes for redox systems are discussed. Variations of the prime candidate anion membrane formulation to achieve better

resistance and/or lower permeability were explored. Processing parameters were evaluated to lower cost and fabricate larger sizes. The processing techniques to produce more membranes per batch were successfully integrated with the fabrication of larger membranes. Membranes of about 107 cm x 51 cm were made in excellent yield. Several measurements were made on the larger sample membranes. Among the data developed were water transport and transference numbers for these prime candidate membranes at 20 C. Other work done on this system included characterization of a number of specimens of candidate membranes which had been returned after service lives of up to sixteen months. Work with new polymer constituents, with new N.P.'s, catalysts and backing fabrics is discussed. Some work was also done to evaluate other proportions of the ingredients of the prime candidate system. The adoption of a flow selectivity test at elevated temperature was explored. Author

N82-30712*# Westinghouse Research and Development Center, Pittsburgh, Pa.

CELL MODULE AND FUEL CONDITIONER DEVELOPMENT Final Report, Oct. 1979 - Jan. 1982

D. Q. Hoover, Jr. Feb. 1982 393 p

(Contracts DEN3-161; DE-AI01-80ET-17088)

(NASA-CR-165193; DOE/NASA/0161-10; NAS 1.26:185193; WEC-82-901-MARED-R1) Avail: NTIS HC A17/MF A01 CSCL 10A

The phosphoric acid fuel cell module (stack) development which culminated in an 80 cell air-cooled stack with separated gas cooling and treed cooling plates is described. The performance of the 80 cell stack was approx. 100 mV per cell higher than that attained furing phase 1. The components and materials performed stably for over 8000 hours in a 5 cell stack. The conceptual design of a fuel conditioning system is described. Author

N82-30713*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

INTEGRATED GASIFIER COMBINED CYCLE POLYGENERATION SYSTEM TO PRODUCE LIQUID HYDROGEN

Raymond K. Burns, Peter J. Staiger, and Richard M. Donovan Jul. 1982 37 p refs

(NASA-TM-82921; E-1308; NAS 1.15:82921) Avail: NTIS HC A03/MF A01 CSCL 10A

An integrated gasifier combined cycle (IGCC) system which simultaneously produces electricity, process steam, and liquid hydrogen was evaluated and compared to IGCC systems which cogenerate electricity and process steam. A number of IGCC plants, all employing a 15 MWe has turbine and producing from 0 to 20 tons per day of liquid hydrogen and from 0 to 20 MWt of process steam were considered. The annual revenue required to own and operate such plants was estimated to be significantly lower than the potential market value of the products. The results indicate a significant potential economic benefit to configuring IGCC systems to produce a clean fuel in addition to electricity and process steam in relatively small industrial applications. Author

N82-30714*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ASSESSMENT OF A 40-KILOWATT STIRLING ENGINE FOR UNDERGROUND MINING APPLICATIONS

James E. Cairelli, Gary G. Kelm, and Jack G. Slaby Jun. 1982 75 p refs

(Contract DI-BM-JO-100026)

(NASA-TM-82822; E-1171; NAS 1.15:82822) Avail: NTIS HC A04/MF A01 CSCL 08I

An assessment of alternative power souces for underground mining applications was performed. A 40-kW Stirling research engine was tested to evaluate its performance and emission characteristics when operated with helium working gas and diesel fuel. The engine, the test facility, and the test procedures are described. Performance and emission data for the engine operating with helium working gas and diesel fuel are reported and compared with data obtained with hydrogen working gas and unleaded gasoline fuel. Helium diesel test results are compared with the characteristics of current diesel engines and other Stirling engines. External surface temperature data are also presented. Emission and temperature results are compared with the Federal requirements for diesel underground mine engines. The durability potential of Stirling engines is discussed on the basis of the experience gaind during the engine tests. Author

N82-30715*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SYNTHETIC BATTERY CYCLING TECHNIQUES

Harold F. Leibecki and Lawrence H. Thaller 1982 8 p refs Proposed for presentation at the 4th ESTEC Spacecraft Power Conditioning Seminar, Noordwijk, Netherlands, 9-11 Nov. 1982; sponsored by ESA

(NASA-TM-82945; E-1351; NAS 1.15:82945) Avail: NTIS HC A02/MF A01 CSCL 10C

Synthetic battery cycling makes use of the fast growing capability of computer graphics to illustrate some of the basic characteristics of operation of individual electrodes within an operating electrochemical cell. It can also simulate the operation of an entire string of cells that are used as the energy storage subsystem of a power system. The group of techniques that as a class have been referred to as Synthetic Battery Cycling is developed in part to try to bridge the gap of understanding that exists between single cell characteristics and battery system behavior. Author

N82-30716*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NICKEL-HYDROGEN BIPOLAR BATTERY SYSTEMS

Lawrence H. Thaller 1982 9 p refs Proposed for presentation at the 4th ESTEC Spacecraft Power Conditioning Seminar, Noordwijk, Netherlands, 9-11 Nov. 1982; sponsored by ESA (NASA-TM-82946; E-1352; NAS 1.15:82946) Avail: NTIS HC A02/MF A01 CSCL 10A

Nickel-hydrogen cells are currently being manufactured on a semi-experimental basis. Rechargeable nickel-hydrogen systems are described that more closely resemble a fuel cell system than a traditional nickel-cadmium battery pack. This has been stimulated by the currently emerging requirements related to large manned and unmanned low earth orbit applications. The resultant nickel-hydrogen battery system should have a number of features that would lead to improved reliability, reduced costs as well as superior energy density and cycle lives as compared to battery systems constructed from the current state-of-the-art nickel-hydrogen individual pressure vessel cells. B.W.

N82-30717*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

CATALYTIC COMBUSTION OF ACTUAL LOW AND MEDIUM HEATING VALUE GASES

Daniel L. Bulzan 1982 19 p refs Presented at the Joint Power Generation Conf., Denver, 17-21 Oct. 1982

(Contract DE-AI01-77ET-10350)

(NASA-TM-82930; E-1326; DOE/NASA/10350-34; NAS 1.15:82930) Avail: NTIS HC A02/MF A01 CSCL 10A

Catalytic combustion of both low and medium heating value gases using actual coal derived gases obtained from operating gasifiers was demonstrated. A fixed bed gasifier with a complete product gas cleanup system was operated in an air blown mode to produce low heating value gas. A fluidized bed gasifier with a water quench product gas cleanup system was operated in both an air enriched and an oxygen blown mode to produce low and medium, heating value gas. Noble metal catalytic reactors were evaluated in 12 cm flow diameter test rigs on both low and medium heating value gases. Combustion efficiencies greater than 99.5% were obtained with all coal derived gaseous fuels. The NOx emissions ranged from 0.2 to 4 g NO2 kg fuel. E.A.K.

N82-30718# Committee on Science and Technology (U. S. House).

REAGAN ADMINISTRATION POLICIES FOR NEW ENERGY TECHNOLOGIES

Paul F. Rothberg, ed., Migdon R. Segal, ed., and Robert Civiak, ed. Washington GPO 1982 84 p Rept. presented to the Subcomm. on Energy Develop. and Appl. and the Subcomm. on Energy Res. and Production of the Comm. on Sci. and Technol., 97th Congr., 2nd Sess., Jun. 1982 Proc. of a Seminar held 15 Oct. 1981 Prepared by Congressional Research Service, Library of Congress

(GPO-94-284) Avail: SOD HC

Energy policies are summarized Analysisof selected advantages and disadvantages of these policies are presented. Chapters III-V are discussions by CRS experts. The possible of these policies in three specific types of energy production--synfuels processes, renewable energy systems, and nuclear energy technologies are discussed. S.L.

N82-30719# Committee on Science and Technology (U. S. House).

ENERGY EFFICIENCY IN FLORIDA'S FUTURE

Washington GPO 1982 244 p refs Hearing before the Subcomm. on Energy Develop. and Appl. of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., no. 79, 26 Oct. 1981 (GPO-91-487) Avail: Subcommittee on Energy Development and Applications

. Florida's efforts to increase energy efficiency are discussed. The roles of government, industry, and citizens are discussed. Numerous programs that will result in energy conservation are described. R.J.F.

N82-30720# Committee on Science and Technology (U. S. House).

ELECTRIC ENERGY SYTEMS AND ENERGY STORAGE

Washington GPO 1982 285 p refs Hearing before the Subcomm. on Energy Res. and Production of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., no. 75, 8 Dec. 1981 (GPO-90-261) Avail: Subcommittee on Energy Research and Production

The energy storage and electric energy systems research and development programs are reviewed, in light of information which indicates these two programs may be terminated. The impact of the withdrawal of Federal participation in these programs is considered. S.L.

N82-30721# RAND Corp., Santa Monica, Calif.

PROMOTING ENERGY EFFICIENCY THROUGH IMPROVED ELECTRICITY PRICING: A MID-PROJECT REPORT

Jan Paul Action, Daniel F. Kohler, Bridger M. Mitchell, and Rolla Edward Park Mar. 1982 117 p refs Sponsored in part by the John A. Hartford Foundation and by the Ford Foundation (Grant NSF DAR-80-12664)

(RAND/N-1843-HF/FF/NSF) Avail: NTIS HC A06/MF A01

Five related areas of electricity demand analysis under alternative rate forms were studied. Adjustments by large commercial and industrial customers are examined. Residential demand under time of day (TOD) pricing is examined. A methodology for evaluating alternative rate structures is developed and applied. Author

N82-30722*# National Bureau of Standards, Washington, D.C. Metallurgy Div.

NON-NOBLE CATALYSTS AND CATALYST SUPPORTS FOR PHOSPHORIC ACID FUEL CELLS Final Report, Oct. 1979 - Sep. 1981

A. J. McAlister Sep. 1981 38 p refs

(NASA Order C-46229-D; Contract DE-AI01-80ET-17088) (NASA-CR-165289; DOE/NASA/6229-2; NAS 1.26:165289) Avail: NTIS HC A03/MF A01 CSCL 10A

Tungsten carbide, which is active for hydrogen oxidation, is CO tolerant and has a hexagonal structure is discussed. Titanium carbide is inactive and has a cubic structure. Four different samples of the cubic alloys W sub x-1Ti sub XC sub 1-y were found to be active and CO tolerant. When the activities of these cubic alloys are weighted by the reciprocal of the square to those of highly forms of WC. They offer important insight into the nature of the active sites on W-C anode catalysts for use in phosphoric acid fuel cells. E.A.K.

N82-30723# Honeywell Power Sources Center, Horsham, Pa.

HIGH EFFICIENCY LITHIUM-THIONYL CHLORIDE CELL Quarterly Report, 9 Oct. 1981 - 8 Jan. 1982

N. Doddapaneni Fort Monmouth, N.J. Army Electronics Research and Development Command Apr. 1982 43 p refs

(Contract DAAK20-81-C-0381; DA Proj. 1L1-62705-AH-94) (AD-A114672; DELET-TR-81-0381-3; QR-3) Avail: NTIS HC A03/MF A01 CSCL 10/3

During the third quarter, cathode optimization with respect to specified variables was completed. Performance evaluation of optimized cathodes at 32 F and 75 F showed both catalyst B and C (FePc) and (CoPc)(n) minimized the electrode overpotential. Plots from rotating disc electrode studies produced parallel straight lines, indicative of a first order reaction mechanism. The slope of the straight line decreased with FePc catalyzed cathodes. This could indicate a change in reaction mechanism. The ac impedance measurements of a carbon electrode indicated extremely slow charge transfer and at high discharge rates, the rates were purely diffusion controlled. GRA

N82-30724# SRI International Corp., Arlington, Va.

ASSESSMENT OF SOME ENERGY TECHNOLOGIES ASSOCIATED WITH SOLAR ENERGY

H. D. Abarbanel, K. M. Case, S. M. Flatte, W. A. Nierenberg, and K. M. Watson Oct. 1981 57 p refs

(AD-A114924; SRI-JSR-81-26) Avail: NTIS HC A04/MF A01 CSCL 10/1

In this report we present our study of three alternative energy generation concepts which employ solar energy in some part of the system. We will discuss these subjects: Salinity Gradient Solar Ponds, Osmotic Membrane Power Generation, and Thermochemical Storage and Transport. The treatment of these items is not uniform. The report will emphasize the ponds, briefly dwell on Osmotic Membranes and only touch on the third topic. This, in fact, reflects the assessment of the potential of the three concepts. GRA

N82-30725# Army Armament Research and Development Command, Dover, N. J. Larger Caliber Weapon Systems Lab.

SOLAR ENERGY APPLICATIONS AT ARMY AMMUNITION PLANTS

Albert P. Lowry and Sam M. Moy Jun. 1982 46 p refs

(AD-A115464; AD-E400841; ARLCD-TR-81038) Avail: NTIS HC A03/MF A01 CSCL 10/2

The Army Ammunition Plants use significant quantities of fossil fuels. To reduce dependence on these scarce, costly, and non-renewable fuels, a study was conducted to investigate potential solar energy applications at the AAPs. Solar energy is a low-level energy source which is best applied to low temperature applications. It can be used at the AAPs to preheat boiler feedwater, provide hot air for dry-houses, provide domestic hot water and heat for administration buildings, and provide hot water for manufacturing processes such as metal cleaning, phosphating, and X-ray film processing. Use of the flat plate collectors, evacuated tube collectors, or solar ponds with the possible addition of a heat pump, offers reasonably economical means of applying solar technology to AAP needs. GRA

N82-30726# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AC RESONANT CHARGING FOR INTERFACING PRIME POWER TO PULSE CONDITIONING CIRCUITS M.S. Thesis

William C. Dungan Dec. 1981 90 p refs

(AD-A115551; AFIT/GE/EE/81D-18) Avail: NTIS HC A05/MF A01 CSCL 10/2

The impact on a prime power source due to ac resonant charging was investigated. The source was a standard DOD 15 KW, 400 Hz alternator. Adverse impact on the alternator was almost negligible for a varying load of 15 to 60 KW and a frequency change of 380 to 475 Hz. The only exception was caused by the pulser diodes. Their turn-on was reflected in the alternator voltage waveforms. An indirect approach is presented for determining resonance and, thus, the internal reactance contribution by the alternator. This value was found to be slightly less than that specified for the leakage reactance. The investigation concludes that resonance, in the classical steady state sense, is never reached. Even though the charging circuit has a transient response, the alternator armature reaction is approximately fixed. This implies that the alternator is in a near steady state mode of operation. Author (GRA)

N82-30727# Army Engineer District, St. Louis, Mo. Mechanical Electrical Section.

PERFORMANCE TEST: OKAW BLUFF BATHHOUSE SOLAR HOT WATER SYSTEM Final Report

M. Mertens and A. H. P. Swift Jun. 1982 13 p

(AD-A115529) Avail: NTIS HC A02/MF A01 CSCL 13/1

This report presents data collected during testing at Okaw Bluff Bathhouse during July, 1980 and uses this data to evaluate the economic and energy conservation benefits of using solar hot water heating systems at recreational bath facilities.

Author (GRA)

N82-30728# Technical Univ. of Denmark, Copenhagen. Lab. for Varmeisolering.

INCIDENT SOLAR RADIATION AND SOLAR HEATING SYSTEMS - MEASURED AND CALCULATED

Henrik Lawaetz Oct. 1980 208 p refs In DANISH

(DE82-900603; DTH-LV-MEDD-106) Avail: NTIS (US Sales Only) HC A10/MF A01; DOE Depository Libraries

The solar gain at the surface of the Earth is measured. Formula expressions to calculate the incident angles of the direct solar radiation on a given surface are developed. Measuring equipment for continuous measurements of the solar radiation on seven surfaces is described. From the measurements of the solar radiation and from the other meteorological weather observations, a calculation method for the determination of the diffuse sky radiation on arbitrary surfaces from horizontally measured radiation was made. The yearly solar gain in Denmark is discussed, and with the use of a method for selecting a reference year such one is selected from meteorological weather observations, and the distribution of the solar gain during the year is drawn. A mathematical model of a solar collector is examined. For some given solar collector designs and weather conditions it is demonstrated that the solar collector output calculated with the described model is in accordance with more complicated models. DOE

N82-30729# Department of Energy, Washington, D. C. Office of Market Analysis.

INTERNATIONAL ENERGY INDICATORS

Edward Rossi, Jr., ed. Dec. 1981 30 p

(DE82-010236; DOE/IA-0010/16) Avail: NTIS HC A03/MF A01

Data on international energy indicators were tabulated and graphically represented. The following data are presented: world crude oil production, 1974 to October 1981; OPEC crude oil productive capacity; world crude oil and refined product inventory levels, 1975 to October, 1981; oil consumption in OECD countries, 1975 to October 1981; USSR crude oil production and exports, 1975 to October 1981; free world and US nuclear electricity generation, 1973 to December, 1981 and current capacity. Specific US data presented are: US domestic oil supply, 1977 to June, 1981; US gross imports of crude oil and products, 1973 to October, 1981; landed cost of Saudi crude current and 1974 dollars; US coal trade, 1975 to September, 1981; US natural gas trade, 1981; and energy/GNP ratio. DOE

N82-30730# Lincoln Lab., Mass. Inst. of Tech., Lexington.

DATA REPORT FOR THE NORTHEAST RESIDENTIAL EXPERIMENT STATION, AUGUST 1981

M. C. Russell, P. Raghuraman, and P. C. Mahoney Oct. 1981 13 p

(Contract DE-AC02-76ET-20279)

(DE82-003348; DOE/ET-20279/164) Avail: NTIS HC A02/MF A01

The physical performance data for the month of August 1981 obtained from photovoltaic energy systems under test at the Northeast Residential Experiment Station in Concord, Massachusetts are given. DOE

N82-30731# Lincoln Lab., Mass. Inst. of Tech., Lexington.

DATA REPORT FOR THE NORTHEAST RESIDENTIAL EXPERIMENT STATION, JULY 1981

M. C. Russell, P. Raghuraman, and P. C. Mahoney Sep. 1981 14 p

(Contract DE-AC02-76ET-20279)

(DE82-001878; DOE/ET-20279/161) Avail: NTIS HC A02/MF A01

The residential experiments stations were designed to develop residential photovoltaic systems and to gather and disseminate performance data for the photovoltaic community, cognizant institutions and, ultimately, the public. Physical performance data obtained from photovoltaic energy systems under test at the Northeast residential experiment station in Concord, Massachusetts are tabulated. DOE

N82-30732# Oak Ridge National Lab., Tenn. Energy Div.

OPERATIONAL CONCEPTS FOR LARGE WIND-TURBINE ARRAYS

T. W. Reddoch, P. R. Barnes, J. S. Lawler (Tennessee Univ., Knoxville), and J. C. Skroski (DOE, Washington) 1981 11 p refs Presented at the 5th Biennial Wind Energy Conf. and Workshop, Washington, 5 Oct. 1981

(Contract W-7405-eng-26)

(DE82-002876; CONF-811043-6) Avail: NTIS HC A02/MF A01

A primary application of wind electric generation which will be large clusters or arrays of megawatt-size wind turbines connected to the utility transmission network is discussed. Array output power variations due to the uncontrolled nature of the wind resource can cause undesirable dynamic impacts on the utility system. Consequently, spinning reserve, unloadable generation, and load following requirements and their associated economic penalties tend to increase as wind electric generation is added to the system. However, if array power variations are limited and/or anticipated, the associated operation and economic penalties can be significantly reduced. Operational concepts which have the potential to enhance the effectiveness of wind turbine arrays in the utility system are considered. GRA

N82-30733# California Univ., Livermore. Lawrence Livermore Lab.

HOT-DRY-ROCK ENERGY: REVIEW OF ENVIRONMENTAL ASPECTS

Kerry OBanion 13 Oct. 1981 40 p refs

(Contract W-7405-eng-48)

(DE82-003283; UCRL-53204) Avail: NTIS HC A03/MF A01

The potential environmental and socioeconomic impacts of the production of energy contained in hot dry rock (HDR) was surveyed. The most important uncertainty among the environmental concerns is the seismic response of HDR formations to short duration fluid injections at pressures above fracture thresholds; continued monitoring at HDR development sites is necessary. The indirect jobs resulting from such development, which could cause significant demographic impacts in sparsely populated regions are of great importance. However, such indirect growth is not expected to begin until a large, stable HDR industry is established in a region, whcih makes impacts permanent rather than transient. GRA

N82-30734# California Univ., Livermore. Lawrence Livermore Lab.

PULSED-LASER TECHNIQUES FOR TRANSIENT MEASUREMENTS AT SEMICONDUCTOR PHOTOELECTROCHEMICAL SOLAR CELLS

J. H. Richardson, S. P. Perone, S. B. Monaco, L. L. Steinmetz, and J. E. Harrar Oct. 1981 23 p refs Presented at the Electrochem. Soc. Conf., Denver, 12-16 Oct. 1981

(Contract W-7405-eng-48)

(DE82-003056; UCRL-85823; CONF-811013-8) Avail: NTIS HC A02/MF A01

Pulsed laser excitation sources provide a convenient means of initiating and probing photophysical and photochemical processes at the semiconductor electrode electrolyte interface. Both time resolved optical and electrochemical measurements are used to characterize the dynamics of intra-electrode charge separation and interfacial charge transfer as a function of applied bias, solution composition, and electrode physical properties. The philosophy behind this approach to transient measurements will be illustrated with recent experimental results involving single crystal and polycrystalline electrodes. DOE

N82-30735# Science Applications, Inc., McLean, Va. Solar Technology Div.

EVALUATION OF THERMAL-STORAGE CONCEPTS FOR SOLAR COOLING APPLICATIONS

P. J. Hughes, J. H. Morehouse, M. K. Choi, N. M. White, and W. B. Scholten Oct. 1981 85 p refs

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE82-004035; SERI/TR-09083-1) Avail: NTIS HC A05/MF A01

Various configuration concepts for utilizing thermal energy storage to improve the thermal and economic performance of solar cooling systems for buildings were analyzed The storage concepts evaluated provide short-term thermal storage via the bulk containment of water or salt hydrates. The evaluations were made for both residential-size cooling systems (3-ton) and small commercial-size cooling systems (25-ton). The residential analysis considers energy requirements for space heating, space cooling and water heating, while the commercial building analysis is based only on energy requirements for space cooling. The commercial building analysis considered a total of 10 different thermal storage/solar systems, 5 each for absorption and Rankine chiller concepts. The residential analysis considered 4 thermal storage/solar systems, all utilizing an absorption chiller. The trade-offs considered include: cold-side versus hot-side storage, single vs multiple stage storage, and phase-change vs sensible heat storage. DOE

N82-30736# Cairo Univ. (Egypt). Dept. of Mechanical Engineering.

PARAMETRIC STUDY OF TORNADO-TYPE WIND-ENERGY SYSTEMS

S. S. Ayad Oct. 1981 15 p refs Presented at the 5th Bien. Wind Energy Conf. and Workshop, Washington, D.C., 5 Oct. 1981

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE82-001795; SERI/TP-211-1391; CONF-811043-3) Avail: NTIS HC A02/MF A01

The tornado-type wind energy system uses the pressure drop created by an intense vortex. The vortex is generated in a tower mounted at the turbine exit. The tower serves as a low pressure exhaust for the turbine. The effects of embedding the tower in an atmospheric boundary layer varying the tower height to diameter ratio, and varying tower diameter using the same system geometry and approach flow conditions are explored. The results indicate a reduction of approx. 28% in power output. DOE

N82-30737# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

ECONOMIC ASSESSMENTS OF INTERMITTENT, GRID-CONNECTED SOLAR ELECTRIC TECHNOLOGIES, A REVIEW OF METHODS

Theresa Flaim, Timothy J. Considine, Robert Witholder, and Michael Edesess Sep. 1981 146 p refs

(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178)

(DE82-002083; SERI/TR-353-474) Avail: NTIS HC A07/MF A01

The methods that were used for economic assessments of intermittent solar technologies in applications that are connected to conventional utility systems are reviewed. Factors to be considered when assessing intermittent technologies are identified and methods that have been used in technology assessment are reviewed. The tradeoffs among methods are qualitatively assessed relative to ease of use and accuracy of results. The best available methods are identified for use when maximum accuracy is desired. Data problems, deficiencies in existing techniques, and unresolved methodological issues are analyzed. Input assumptions and economic figures of merit are also evaluated. E.A.K.

N82-30738# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.

OVERVIEW OF SYSTEMS ANALYSIS, MARKET ASSESSMENT AND CONTROLS WORK

Marshuri L. Warren Aug. 1981 15 p refs Presented at the Active Solar Contractors' Rev. Meeting, Washington, D.C., 9-11 Sep. 1981

(Contract W-7405-eng-48)

(DE82-001015; LBL-13052; CONF-810912-14) Avail: NTIS HC A02/MF A01

Heat pump analysis, absorption and Rankine cooling analysis, and desiccant cooling analysis are reported. National energy savings, meeting cost and performance goals, recent simulation analysis, and controls research are discussed. DOE

N82-30739# California Univ., Berkeley. Lawrence Berkeley Lab. Earth Sciences Div.

SIMPLE MODEL FOR FAULT-CHARGED HYDROTHERMAL SYSTEMS

Gudmundur S. Bodvarsson, Constance W. Miller, and Sally M. Benson Jun. 1981 7 p refs Presented at the Ann. Meeting of the Geothermal Resources Council, Houston, Texas, 5-8 Oct., 1981

(Contract W-7405-eng-48)

(DE82-001008; LBL-12869) Avail: NTIS HC A02/MF A01

A two dimensional transient model of fault-charged hydrothermal systems was developed. The model is used to analyze temperature data from fault charged hydrothermal systems, estimate the recharge rate from the fault, and determine how long the system is under natural development. The model can also be used for theoretical studies of the development of fault controlled hydrothermal systems. The model was tentatively applied to a low temperature hydrothermal system. A reasonable match was obtained with the observed temperature data, and a hot water recharge rate of .0000009 cu m/s.m was calculated. Author

N82-30740# Pennsylvania State Univ., University Park. Materials Research Lab.

PHOTOVOLTAIC AND STRUCTURAL PROPERTIES OF A-Si:H THIN FILMS Annual Technical Report, 1 Jun. 1980 - 31 May 1981

R. Messier and I. S. T. Tsong Oct. 1981 142 p refs

(DE82-002697; SERI/TR-9227-1-T2) Avail: NTIS HC A07/MF A01

Growth mechanisms important in determining the composition, structure, and semiconducting properties of a-Si:H produced by sputtering of Si in an inert gas/H2 plasma were studied. These growth processes were investigated by systematically varying critical external deposition parameters and by observing resultant changes in the plasma-film environment and in film microstructure and properties. Film microstructure, is reduced or eliminated when growth occurs under conditions of negative substrate bias and induced inert gas ion monohydride configuration for H bonded to Si. The beneficial consequences of depositional bombardment are offset by bombardment produced, atomic scale defects. The hydrogen partial pressure in the plasma directly controls the amount of hydrogen in the film. It is found that a minimum of 5 to 15 atomic % H is apparently essential for defect minimization; an elevated substrate temperature has only a small effect on microstructure and hydrogen bonding configuration, but is crucial in reducing the density of intrinsic and bombardment related gap states. GRA

N82-30741# Argonne National Lab., Ill. Applied Geoscience and Engineering Group.

COMPARISON OF LIMITED MEASUREMENTS OF THE OTEC-1 PLUME WITH ANALYTICAL MODEL PREDICTIONS

R. A. Paddock and J. D. Ditmars Jul. 1981 18 p refs

(Contract W-31-109-eng-38)

(DE82-003917; ANL/OTEC-EV-1) Avail: NTIS HC A02/MF A01

Testing of 1-MWe heat exchangers at the ocean thermal energy-1 (OTEC-1) facility aboard the vessel Ocean Energy Converter moored off the island of Hawaii is described. The warm and cold waters used by the OTEC-1 facility were combined prior to discharge from the vessel to create a mixed discharge condition. A limited field survey of the mixed discharge plume using fluorescent dye as a tracer was conducted as part of the environmental studies at OTEC-1. Results of that survey were compared with analytical model predictions of plume behavior. Although the predictions were in general agreement with the results of the plume survey, inherent limitations in the field measurement precluded complete description of the plume or detailed evaluation of the models. DOE

N82-30742# Argonne National Lab., Ill. Energy and Environmental Systems Div.

DISCUSSION PAPER ON ENERGY GRANT ALTERNATIVES

B. Humphrey, Donald Clifford, Forrest Gunnison (Science Applications, Inc.), and John Tatar Jul. 1981 25 p refs

(Contract W-31-109-eng-38)

(DE82-003263; ANL/CNSV-TM-83) Avail: NTIS HC A02/MF A01

The federal grant-in-aid system consisting of categorical grants, block grants, and general revenue sharing are discussed and compared. The types of complications that may arise from implementation of these grants proposals are discussed. Some proposals for the possible consolidation of programs that the Department of Energy offices now administer are summarized. DOE

N82-30743# Ames Lab., Iowa.
FOSSIL-ENERGY Quarterly Report, 1 Apr. - 30 Jun. 1981
Aug. 1981 54 p
(Contract W-7405-eng-82)
(DE82-003213; IS-4775) Avail: NTIS HC A04/MF A01

Progress in the following areas of fossil energy is reported: physiochemical cleaning and recovery of fine coal; a systematic investigation of the organosulfur components in coal; microstructures of coal; rapid analysis of mineral content in coal, coal blending experiments; performance characteristics of heavy media cyclones using fly ash derived heavy media; briquetting solvent treated coal; and coal preparation and testing. GRA

N82-30744# Aerospace Corp., Germantown, Md.
FOURTH US DEPARTMENT OF ENERGY BATTERY AND ELECTROCHEMICAL CONTRACTORS' CONFERENCE ABSTRACTS VISUAL PRESENTATIONS
Jun. 1981 475 p Conf. held at Washington, D.C., 2-4 Jun. 1981
(Contract DE-AI01-79ET-25204)
(DE82-000075; CONF-810642-Absts) Avail: NTIS HC A20/MF A01

Various aspects of electrochemistry and battery technology are discussed. Topics include near term batteries, solar applications, advanced batteries (fused salt electrolytes) electrolyte technology, fuel cells for electric vehicles, and systems analysis studies. DOE

N82-30745# Aerospace Corp., Germantown, Md.
ELECTROCHEMICAL STORAGE SYSTEMS PROGRAM SUMMARY
Jun. 1981 239 p Presented at the 4th DOE Battery and Electrochem. Contractor's Conf., Washington, D.C., 2-4 Jun. 1981
(Contract DE-AI01-79ET-25204)
(DE82-000076; CONF-810642-Summ) Avail: NTIS HC A11/MF A01

Battery technology and electrochemistry are discussed. Topics include electric batteries, solar applications, electric vehicles, and photovoltaic technology. DOE

N82-30746# Brookhaven National Lab., Upton, N. Y.
APPLICATION OF THE BROOKHAVEN ENERGY-ECONOMIC ASSESSMENT MODEL IN THE PORTUGAL-U.S. COOPERATIVE ASSESSMENT
S. Rogers, Gordon McGranahan, Steve Kyle, and Vinod Mubayi
Jun. 1981 74 p refs
(Contract DE-AC02-76CH-00016)
(DE82-003256; BNL-51424) Avail: NTIS HC A04/MF A01

The application of the Brookhaven Energy Economic Assessment Model (BEEAM) in the Portugal-US Cooperative Energy Assessment is described. Two projections of economic growth were used to drive the model. The main objectives in applying BEEAM were to investigate the detailed structure of energy deman at a sectoral level; the primary energy resources required to meet the final energy demand; the overall balance of trade due to both energy and nonenergy imports; the consistency or lack thereof between the projected sectoral growth rates; and the implication of the growth rates in regard to aggregate levels fixed capital formation. The impacts of the accelerated and moderate energy conservation cases developed on energy demand, resource requirements, and the balance of trade were also determined. The structure of BEEAM, which consists of an energy-denominated input-input repesentation of the economy coupled to an energy supply-demand network and its mode of application in the Portugal assessment are described. DOE

N82-30747# Castle Technology Corp., Woburn, Mass.
RECYCLE OF BATTERY COMPONENTS Final Report
J. Paul Pemsler and Robert A. Spitz 1981 109 p refs
(Contract DE-AC02-80ET-25206)
(DE82-003659; DOE/ET-25206/1) Avail: NTIS HC A06/MF A01

The recycle disposal scenaro for the batteries nickel/zinc, nickel/iron, zinc/chlorine, zinc/bromine, sodium/sulfur and lithium-aluminum/metal sulfide was considered. Flowsheets are presented which include disassembly, materials handling, melting or solubization, liquid/solid separations, purifications and waste handling. Material and energy balances are provided for all major streams and capital and operating costs for typical plant sizes are presented. Recycle is a a viable option in all cases. Recommendations are made for the best process options and for additional studies on the sodium/sulfur and lithium-aluminum/metal sulfide batteries. E.A.K.

N82-30748# Sandia Labs., Albuquerque, N. Mex.
CARRIER SIGNAL TECHNOLOGY APPLIED TO SOLAR COLLECTOR FIELD CONTROL
Robert L. Alvis 1981 16 p refs Presented at the 4th Ann. Tech. Conf. of the ASME Solar Energy Div., Albuquerque, N. Mex., 26 Apr. 1981
(Contract DE-AC04-76DP-00789)
(DE82-001775; SAND-81-2045C; CONF-8104112-1) Avail: NTIS HC A02/MF A01

The development and operational performance are described of a control system designed specifically for solar distributed collector field systems. Carriet technology is employed to eliminate costly field constructed control wiring and allows the control system quality to be controlled at system suppliers' plants. Prototype hardware has been built and tested in the field with excellent operating results. DOE

N82-30749# Sandia Labs., Albuquerque, N. Mex. PV System Definition Div.
ASSESSMENT OF THE FEASIBILITY OF THE WIDESPREAD PHOTOVOLTAIC RETROFITS
John L. Jackson 1981 14 p refs Presented at the Univ. of Mo. Dept. of Nat. Resources Conf. on Energy, Rolla, 6 Nov. 1981
(Contract DE-AC04-76DP-00789)
(DE82-003051; SAND-81-1147C; CONF-811137-1) Avail: NTIS HC A02/MF A01

Some of the economic implications of retrofits and retrofit designs which might be employed are considered. Residential and commercial retrofits may represent a significant national market for photovoltaic (PV) systems. Techniques for estimating the photovoltaic retrofits market and present preliminary conclusions about physical market size are discussed. Possible institutional barriers to widespread retrofits are reviewed. GRA

N82-30750# Sandia Labs., Albuquerque, N. Mex. Theoretical Div.
USER'S GUIDE TO HELIOS: A COMPUTER PROGRAM FOR MODELING THE OPTICAL BEHAVIOR OF REFLECTING SOLAR CONCENTRATORS. PART 3: APPENDICES CONCERNING HELIOS-CODE DETAILS
C. N. Vittitoe and Frank Biss Sep. 1981 89 p refs
(Contract DE-AC04-76DP-00789)
(DE82-003077; SAND-81-1562) Avail: NTIS HC A05/MF A01

HELIOS is a flexible computer code for evaluating designs for central-receiver, parabolic-dish, and other reflecting solar-energy collector systems; for safety calculations on the threat to personnel and to the facility itself; for determination of how various input parameters alter the power collected; for design trade-offs; and for heliostat evaluations. Input variables include atmospheric transmission effects; reflector shape, surface, and suntracking errors; focusing and alignment strategies; receiver design; placement positions of the tower and mirrors; time-of-day and day-of-year for the calculation. Part III is a series of appendices giving code details for subroutine and function descriptions, how common blocks are used, sample jobstreams, and magnetic tape use within the code. DOE

N82-30751# Sandia Labs., Albuquerque, N. Mex.
ADVANCED TECHNOLOGY FOR IN SITU TECHNOLOGY AND FOSSIL ENERGY
R. K. Traeger 1981 14 p Presented at the Showcase for

Technol. Conf., Albuquerque, N. Mex., 28 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE82-001315; SAND-81-2222C; CONF-811018-2) Avail: NTIS HC A02/MF A01

The technological capabilities and programs carried out at universities and national laboratories in new Mexico in the areas of exploration, drilling and mining, recovery processes, conversion processes, diagnostics, and environmental effects of fossil energy resource development are discussed. DOE

N82-30752# Sandia Labs., Albuquerque, N. Mex.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE EXECUTIVE SUMMARY. VOLUME 2 FOR MT. LAGUNA RADAR STATION, MT. LAGUNA, CALIF.
Oct. 1981 7 p Prepared in cooperation with Boeing Computer Services Co., Seattle
(Contract DE-AC04-76DP-00789)
(DE82-003682; SAND-81-7104-Vol-2) Avail: NTIS HC A02/MF A01

For the month of August 1981, the daily and monthly electricity production, daily and monthly insolation, monthly average photovoltaic array efficiency, power conditioner efficiency, photovoltaic system efficiency, and capacity factor are given for a photovoltaic power supply for a California radar base. DOE

N82-30753# Sandia Labs., Albuquerque, N. Mex.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 4 FOR LOVINGTON SQUARE SHOPPING CENTER, LOVINGTON, N. MEX.
Oct. 1981 18 p Prepared in cooperation with Boeing Computer Services, Co., Seattle 4 Vol.
(Contract DE-AC04-76DP-000789)
(DE82-003080; SAND-81-7985/4) Avail: NTIS HC A02/MF A01

For the month of August 1981, performance data are given for a photovoltaic power supply at a New Mexico shopping center. Data include: daily and monthly electricity production, daily and monthly insolation data, daily and monthly array efficiency, graphs of energy production vs. power level, array field voltage, cell temperature, and hour of the day, daily photovoltaic system availability, heating and cooling degree days, average ambient temperature, average wind speed for the month, cell temperature, ambient temperature, wind speed and insolation graphed vs. hour of the day, and wind direction distribution. DOE

N82-30754# Sandia Labs., Albuquerque, N. Mex. Geothermal Technology Development Div.
GEOTHERMAL TECHNOLOGY DEVELOPMENT PROGRAM Quarterly Progress Report, Apr. - Jun. 1981
James R. Kelsey, ed. Oct. 1981 69 p refs
(Contract DE-AC04-76DP-00789)
(DE82-003110; SAND-81-2093) Avail: NTIS HC A04/MF A01

The Geothermal technology development program is described. Special attention is given to the ongoing research in rock penetration mechanics, fluid technology, borehole mechanics, and diagnostics technology. L.F.M.

N82-30755# BDM Corp., Albuquerque, N. Mex.
GEOTHERMAL WELLS: A FORECAST OF DRILLING ACTIVITY
Gerald L. Brown, A. J. Mansure, and J. N. Miewald Jul. 1981 65 p refs
(Contract DE-AC04-76DP-00789)
(DE82-003109; SAND-81-7127; BDM/TAC-80-557-TR-R2) Avail: NTIS HC A04/MF A01

Numbers and problems for geothermal wells expected to be drilled in the United States between 1981 and 2000 AD are forecasted. The 3800 wells forcasted for major electric power projects (totaling 6 GWe of capacity) are categorized by type (production, etc.), and by location (The Geysers, etc.). 6000 wells are forecasted for direct heat projects (totaling 0.02 Quads per year). Equations are developed for forecasting the number of wells, and data is presented. Drilling and completion problems in The Geysers, The Imperial Valley, Roosevelt Hot Springs, the Valles Caldera, northern Nevada, Klamath Falls, Reno, Alaska, and Pagosa Springs are discussed. Likely areas for near term direct heat projects are identified. DOE

N82-30756# Sandia Labs., Livermore, Calif.
HELIOSTAT COST-ANALYSIS TOOL
L. D. Brandt and R. E. Chang Oct. 1981 52 p refs
(Contract DE-AC04-76DP-00789)
(DE82-003879; SAND-81-8031) Avail: NTIS HC A04/MF A01

A heliostat cost analysis tool (HELCAT) that processes manufacturing transportation, and installation cost data was developed which provides a consistent structure for cost analyses. The HELCAT calculates a representation product price based on direct input data and various economic, financial, and accounting assumptions. The characteristics of this tool and its initial application in the evaluation of second generation heliostat cost estimates are discussed. A set of nominal economic and financial parameters is also suggested. GRA

N82-30757# Westinghouse Electric Corp., East Pittsburgh, Pa. Research and Development Center.
AIR/GAS SYSTEM DYNAMICS OF FOSSIL-FUEL POWER PLANTS, VOLUME 5. SYSTEM EXCITATION SOURCES Interim Report, Oct. 1981
F. R. Goldschmied, D. N. Wormly, and D. Rowell Oct. 1981 209 p refs Prepared in cooperation with MIT 5 Vol.
(EPRI Proj. 1651)
(DE82-900878; EPRI-CS-1444-Vol-5) Avail: NTIS HC A10/MF A01

Combustion air/flue gas system dynamic problems in fossil fuel power plants involving significant pressure and flow dynamic variations are addressed. A computer based mathematical model was used to study system stability, surging and transient response to changes in damper settings and disturbances generated by fans and other equipment. Low frequency periodic oscillations resulting from air preheater rotation and higher frequency disturbances resulting from forced draft induced draft and recirculation fans were identified. Significant disturbances were found at frequencies corresponding to fan rotation speed and its harmonics, including blade passage frequency. The fan was operated at flows corresponding to and less than the peak efficiency point, and a disturbance associated with rotating stall at a frequency of approximately two thirds of rotation frequency was produced. GRA

N82-30758# Argonne National Lab., Ill.
ENERGY AND MATERIALS FLOWS IN THE CEMENT INDUSTRY
J. E. Sapp Jun. 1981 230 p refs
(Contract W-31-109-eng-38)
(DE82-001609; ANL/CNSV-17) Avail: NTIS HC A11/MF A01

The cement industry is a large user of energy. In 1976, for example, the cement industry consumed 0.7% of the nation's direct energy, using 50 million tons of coal, 5.5 million barrels of fuel oil, 88,107 million cubic feet of natural gas, and 10,558 million kilowatt hours of electricity. Earlier, in 1971 when the cement industry was sixth in total energy use for heat and power among SIC four digit industries, cement production consumed the most coal in that SIC group. From 1947 through 1976, the period covered by this study, cement industry energy consumption increased by 58%. However, process improvements during that period reduced the direct energy needed to produce a metric ton of cement 23% for dry processors and 17% for wet processors. There are contraints but further energy reductions are possible for individual producers through continued equipment modernization. DOE

N82-30759# Stockholm Univ. (Sweden). Inst. of Physics.
LONG RANGE ENERGY DEMAND
Tor Ragnar Gerholm, Stefan Meisels, Lars Brandell, Trobjoern Thedeen, Lennart Claesson, and Per Naesman Jan. 1982 80 p refs In SWEDISH; ENGLISH summary
(Contract NE-31.17.1)
(USIP-82-02) Avail: NTIS HC A05/MF A01

A mathematical model of energy consumption was developed, taking into account annual energy price increase and price

elasticity. The parameters of this formula were determined by statistical analysis, using historical data for the world divided into seven major regions with similar economic systems. The model can be used for long range forecasting assuming no trend break occurs. Calculations are presented up to 2020, for all seven world regions and for Sweden, the error being within - 15% and + 15% with a confidence of 95 %. The results are compared with actual outcome for 1979 and with other similar projections. A possible extension of the model to include major deviations from current trends by soft modeling techniques is discussed. Author (ESA)

N82-30760# Technische Universitaet, Munich (West Germany). Lehrstuhl C fuer Thermodynamik.

ENERGY CONSERVATION IN BUILDINGS USING ADJUSTABLE LOUVER SYSTEMS Final Report, Mar. 1981

Klaus Gehlisch Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 216 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-037; ISSN-0340-7608) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 38

Energy saving by installation of movable louvers in front of walls and windows was investigated relative to the heating and cooling of buildings. Computer simulation of diurnal and annual variation of direct and diffuse insolation, long wave atmospheric radiation, air temperature and cloudiness was conducted. Annual heating and cooling loads per square meter window surface (double glazing; southern orientation) and per square meter wall surface (with and without insulation; south, east, and west orientation) were numerically evaluated, using an implicit differential method with a 1 hour time step. The mathematical model describes both convective heat transfer on either side of the wall and long wave as well as short wave radiation between wall, louvers and the surroundings. The annual energy saving by application of a louver system with optimum tilt angle amounts to 30%. Author (ESA)

N82-30761# Kinetics Technology International G.m.b.H., Hamburg (West Germany).

COAL FIRING OF PROCESS HEATERS Final Report, Oct. 1980

Wolff Balthasar, Juergen Schoedel, Roberto Ruggieri, and Jan vanRijnsoever Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 67 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-056; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13.50

Coal firing as a standard practice was reviewed. With the recent resurgence of coal utilization, coal firing of modern process furnaces was studied in light of significant developments in boiler design. A process heater for coal firing was designed and results were compared with oil fired units. Typical furnaces with oil firing of recent manufacture were used. Results show that furnaces can be built with coal firing under various design philosophies, but all of them are more expensive than for oil firing. All these analyses do not even include coal storage, grinding and feed as well as dust collection and flue gas treatment. Hence, coal firing of process furnaces is far too expensive. Author (ESA)

N82-30762# Battelle Inst., Frankfurt am Main (West Germany). Hauptabt. Energie- und Transportsysteme.

THE BEHAVIOR OF A LONG TERM HEAT STORAGE SYSTEM IN CONNECTION WITH A WIND ENERGY CONVERTER (PHASE 1) Final Report, May 1980

Falk Auer, Herbert Bley, and Manfred Mueller Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 65 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-057; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13.50

The technical and economical feasibility of heating a museum on the Wasserkuppe mountain (950 m) in the Rhoen hills by wind energy is affirmed. It is possible to recover the capital cost within a period of 15 to 19 years if the service life of the wind energy converter (WEC) and of the heat storage system is between 20 and 30 years. At a maximum thermal load of 120 kW, the minimum cost will be achieved with a WEC power output of 120 kW and a two day storage system. This combination permits 60% of the heat demand to be covered by wind energy. The balance has to be supplied by conventional energy sources. The wind energy fraction of the total energy demand thus is about twice as high as the solar fraction in the case of solar heating systems and about 15% higher than the fraction of ambient heating energy in the case of electric heat pumps used in bivalent operation. The wind price per kWh is already comparable to that expected for the future large wind energy converters (GROWIAN) to be produced in series. Author (ESA)

N82-30763# Metallgesellschaft, A.G., Frankfurt am Main (West Germany).

DEVELOPMENT OF INDUSTRIAL PRODUCTION PROCESSES FOR COMPONENTS OF SOLAR HEATING SYSTEMS, ESPECIALLY SOLAR COLLECTORS Final Report, Aug. 1981

Manfred Moeller Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 120 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-059; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 25

Work in preparation for the manufacturing on an industrial scale of solar collectors as well as components for solar heating systems with long service life is described. A suitable selective coating with excellent optical properties for Al absorber panels was developed. Reliable knowledge was acquired on the compatibility of different materials with aqueous and synthetic heat transfer fluids in recirculating solar collector systems. The temperature distribution in the collector was calculated and served as a basis for the design of the transparent cover. The development of sealing compounds with permanent elasticity at constant temperatures up to 120 C make it possible to construct hermetically sealed collector housings. Testing of systems is completed and efficient solar collectors are now on the market. Author (ESA)

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-30764*# National Aeronautics and Space Administration, Washington, D. C.

INFLUENCE OF THE NUMBER OF VEHICLES IN THE EMERGENCE OF SOUND EVENTS ON THE ANNOYANCE EXPRESSED - EXPERIMENTAL STUDY Final Report

M. Vallet Mar. 1982 52 p refs Transl. into ENGLISH of "Influence du Nombre de Vehicules et de lEmergence des Evenements Sonores sur la Gene Exprimee - Etude Experimentale" rept. AER-IV.2(7306) Bron Cadex, France, Mar. 1981 57 p Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Inst. de Recherche des Transports, France

(Contract NASw-3541)

(NASA-TM-76701; NAS 1.15:76701) Avail: NTIS HC A04/MF A01 CSCL 13B

The acoustical index leg was studied to determine its accuracy in predicting annoyance from traffic noise. Annoyance was tested in experimental situations where the frequency of the number of heavy vehicles varied from 3 to 30 HV/30 min for different classes of the Leg level at 50, 55, 60 dB(A) of traffic noise. The results showed that: (1) for a constant Leg level the annoyance increases as a function of the number of HV up to a certain threshold at which the annoyance is stabilized; (2) for a constant frequency of passage of HV, the annoyance increases with the Leg level; (3) composite indexes of the type Leg + Log NHV, L1 + EMER or L1 + L10 give a predictive value greater than that of the Leg pr Log nHV taken alone. B.W.

N82-30765*# National Aeronautics and Space Administration, Washington, D. C.
REMOVAL OF CARBON MONOXIDE. PHYSICAL ADSORPTION ON NATURAL AND SYNTHETIC ZEOLITES
Francesco Alfani, Guido Greco, Jr., and Gabriele Iroio Jul. 1982 16 p refs Transl. into ENGLISH from Inquinamento (Italy), v. 20, May 1978 p 51-55 Original language doc. was announced as A78-46489 Transl. by Scientific Transl. Service, Santa Barbara, Calif. Original doc. prep. by Naples Univ.
(Contract NASW-3542)
(NASA-TM-76934; NAS 1.15:76934) Avail: NTIS HC A02/MF A01 CSCL 13B

The utilization of natural zeolite materials in the elimination of polluting gases is investigated. Carbon monoxide pollution is emphasized because its concentration may reach dangerous levels in places such as vehicle tunnels, underground parking lots, etc. The elimination of carbon monoxide is also of interest in some industrial processes relating to the production of pure gases. S.L.

N82-30766# Army Engineer Waterways Experiment Station, Vicksburg, Miss.
PROCESS DESIGN AND COST ESTIMATING ALGORITHMS FOR THE COMPUTER ASSISTED PROCEDURE FOR DESIGN AND EVALUATION OF WASTEWATER TREATMENT SYSTEMS (CAPDET) Final Report
Roy W. Harris, M. John Cullinane, Jr., and Paul T. Sun Jan. 1982 736 p refs
(AD-A115314) Avail: NTIS HC A99/MF A01 CSCL 13/2

The need for a method of accurate and rapid preliminary design, and cost estimating for wastewater treatment plant construction projects has long been recognized. Various models have been developed which purport to prepare planning or design level cost estimates. Few of these models are responsive to the requirements of the planner or engineer responsible for accurately projecting construction costs for the purpose of alternative evaluation. The CAPDET model was developed with the specific intent of assisting personnel responsible for wastewater treatment planning in the evaluation of wastewater treatment alternatives based primarily on life cycle costs and degree of treatment provided. This cost estimating procedure uses both parametric and unit cost estimating techniques. Author (GRA)

N82-30767# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
AQUACULTURE FACILITY POTENTIAL AT BOULDER HOT SPRINGS, BOULDER, MONTANA
J. G. Keller Nov. 1981 20 p refs
(Contract DE-AC07-76ID-01570)
(DE82-005244; EGG-GTH-5512; GTA-Rept-1) Avail: NTIS HC A02/MF A01

The potential of using geothermal water to develop a commercial aquaculture facility to raise channel catfish at Boulder Hot Springs, Montana is examined. Maximum catfish growth occurs in water with a temperature from 800 F to 850 F. This temperature can be maintained when the 1750 F geothermal water is mixed with the available 550 F water. The only economically viable culture considered was the raceway culture. The 4000 gpm supply of 550 F water could supply 7 to 8 raceways with a total production of 269,000 to 307,000 pounds of catfish per year. DOE

N82-30768# National Oceanic and Atmospheric Administration, Oak Ridge, Tenn. Atmospheric Turbulence and Diffusion Lab.
REVIEW OF DETERMINISTIC URBAN AIR QUALITY MODELS FOR INERT GASES
R. W. Simpson (Griffith Univ., Queensland, Australia) and S. R. Hanna Silver Spring, Md. Sep. 1981 89 p refs
(Contract DE-AI05-76EV-03688)
(DE82-004720; ERLTM-ARL-106) Avail: NTIS HC A05/MF A01

Deterministic air quality models for inert gases in urban areas were examined. The usefulness of the various approximations representing the dispersion of airborne pollutants is studied. Model predictions and the usefulness of such predictions are summarized. The properties of the various theories of atmospheric dispersion predict pollutant levels are outlined and the effectiveness of the different treatments of turbulent diffusion are considered. DOE

N82-30769# Meteorology Research, Inc., Altadena, Calif.
MEASUREMENT OF SULFATE AEROSOLS FROM WESTERN LOW-RANK COAL-FIRED BOILERS WITH FGD: RESULTS OF TESTS AT COAL CREEK UNIT 1
Jerry L. Downs 6 Oct. 1981 50 p
(Contract DE-AC18-80FC-10182)
(DE82-001123; DOE/FC-10182/T14; MRI-81-R1841) Avail: NTIS HC A03/MF A01

A test to investigate the quantity and type of aerosol sulfates emitted from Western low-rank coal-fired utility boilers with flue gas desulfurization (FGD) systems is discussed. The average particulate removal efficiency of the module tested was 79 percent as calculated from the instack filter results. The absolute amount of sulfate was roughly the same at inlet and outlet. The impactor total mass loading results are in fair agreement with those measured with the instack filters. The size dependent particulate removal by the scrubber may be characterized by the size at 50 percent collection efficiency, or cut point of the scrubber. The cut point is about 1.5 micrometers physical diameter. The average SO2 removal efficiency of the FGD module was 95 percent, based on the wet chemical SO2 measurements. On the average, based on the instack filter results, 13 percent of the particulate mass loading at the inlet sulfate. At the outlet, this fraction increased to 33 percent. DOE

N82-30770# Meteorology Research, Inc., Altadena, Calif.
MEASUREMENT OF SULFATE AEROSOLS FROM WESTERN LOW-RANK COAL-FIRED BOILERS WITH FGD: RESULTS OF TESTS AT MILTON R. YOUNG UNIT 2
J. L. Downs 6 Oct. 1981 51 p
(Contract DE-AC18-80FC-10182)
(DE82-001124; DOE/FC-10182/T13; MRI-81-R1840) Avail: NTIS HC A04/MF A01

Part of a program to investigate the quantity and type of aerosol sulfates emitted from Western low-rank coal-fired utility boilers with flue gas desulfurization systems is discussed. The average particulate removal efficiency of the module tested was 38 percent, as calculated from instack filter results for 10, 11, and 12 June. The impactor total mass loading results are in fair agreement with those measured with the instack filters. The size dependent particulate removal by the scrubber may be characterized by the size at 50 percent collection efficiency, or the cut point of the scrubber. The cut point is about 1.2 micrometers physical diameter. The average SO2 removal efficiency of Module A11, basedon the continuous monitor results, was 91 percent. On the average, based on the instack filter results, 40 percent of the particulate mass loading at the inlet is sulfate. At the outlet, this fraction was 27 percent. The absolute amount of sulfate is roughly the same at inlet and outlet. DOE

N82-30771# California Univ., Livermore. Lawrence Livermore Lab. Environmental Sciences Div.
EFFECTS OF NATURAL PETROLEUM SEEPS
Robert B. Spies Jun. 1981 28 p refs Prepared for National Academy of Sciences - National Research Council
(Contract W-7405-eng-48)
(DE82-003172; UCID-19071) Avail: NTIS HC A03/MF A01

The effects of petroleum on biological processes in the oceans was studied. Unless otherwise indicated, all references are to seeps near Coal Oil Point in the Santa Barbara channel. It is suggested that the amount and type of oil exposure to organisms depends on the mode of life. DOE

N82-30772# Joint Research Centre of the European Communities, Ispra (Italy).
EXPERIMENTAL DETERMINATION OF THE ATMOSPHERIC DISPERSION PARAMETERS: EXPERIMENT PERFORMED 2 JULY 1980 AT THE KARLSRUHE NUCLEAR RESEARCH CENTER
H. Schuettelkopf (Karlsruhe Nuclear Research Centre, West Germany), P. Thomas (Karlsruhe Nuclear Research Centre, West Germany), S. Vogt (Karlsruhe Nuclear Research Centre, West Germany), M. DeBortoli, and P. Gaglione 1981 42 p refs Submitted for publication
(EUR-7577-EN) Avail: NTIS HC A03/MF A01

In order to examine atmospheric dispersion parameters, CFC13, CF2Br2 and SF6 were released simultaneously from the

160 m and 195 m platforms of a meteorological tower. Near ground sampling was performed at up to 67 positions at downwind source distances between 500 m and 8.5 km during two 30 min periods, under stability class D conditions. Tracer CFC13 was analyzed by two laboratories, so four sets of concentrations from the tracers are available, from which dispersion parameters and diffusion factors were calculated. The vertical dispersion parameters and diffusion factors determined from the different sets of concentrations agree well. Differences occur in the horizontal dispersion parameters due to different emission heights and different arrangements of sampling locations. Compared to earlier experiments, vertical dispersion parameters agree well while horizontal parameters are smaller due to the narrow distribution of the wind direction. Author (ESA)

N82-30773# Kernforschungsanlage, Juelich (West Germany). Inst. Fuer Chemie.

ATMOSPHERIC CONCENTRATION OF TOXIC METALS IN THE FEDERAL REPUBLIC OF GERMANY: EMISSION AND DEPOSITION [ATMOSPHAERISCHE BELASTUNG DURCH TOXISCHE METALLE IN DER BUNDESREPUBLIK DEUTSCHLAND. EMISSION UND DEPOSITION]

J. D. Schladot and H. W. Nuernberg Apr. 1982 86 p refs In GERMAN; ENGLISH summary

(JUEL-1776; ISSN-0366-0885) Avail: NTIS HC A05/MF A01

Data for emission, atmospheric concentration and deposition of toxic trace metals were collected from recent literature. A calculation of toxic metals emission, based on the specific emission factors for various pollution sources, is presented which, in spite of scarce data for lead, cadmium and zinc, is used to compute a preliminary balance between emission and deposition. Since deposition is found to be regularly higher than expected from emission data, the existence of contributions from external pollution sources outside the territory can be presumed. The ecotoxicological importance of metal pollution is considered. Results lead to recommendations for intensified research. Author (ESA)

N82-30774# Karlsruhe Univ. (West Germany). Inst. fuer Ingenieurbiologie und Biotechnologie des Abwassers.

OPTIMIZATION AND CONTROL OF AN ACTIVATED SLUDGE PROCESS BY ADAPTATION OF AERATION TANK VOLUME Final Report, Dec. 1979

Rainer Staud Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 151 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-046; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 31,50

An activated sludge treatment process was optimized during a full scale study at a municipal waste water treatment plant. Influent loading fluctuations were accommodated by operating a variable number of the four parallel treatment plant units (aeration tank/clarifier) available. During downtime, the aerators were switched off and the activated sludge was stored anaerobically. This allows for equalization of the nutrient supply to the microorganisms, improving metabolic potential, as well as decreasing the energy demand for aeration. An algorithm was developed in order to achieve this process control. Initial parameters are through-flow rate, biomass concentration, and BOD plateau (used to evaluate substrate concentration). Results prove the practicability of this concept. Average substrate loading increases, but there is no consequent decrease in overall process efficiency. A 47% savings in energy for aeration is achieved. Author (ESA)

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation*.

N82-30775 Academy of Sciences (USSR), Moscow. Space Research Inst.

ACCELERATION OF IONOSPHERIC IONS AT HIGH ALTITUDES (10-15 R SUB E) BY THE DATA OF THE PROGNOZ 7 SATELLITE

E. M. Dubinin 1982 42 p refs

(Rept-688) Copyright. Avail: Issuing Activity

Acceleration mechanisms in ionization kinetics are discussed. Ion flow of ionospheric origin in the latitude boundary layer of the Earth magnetosphere were recorded. The angular and energetic characteristics of the ions indicate that at intermediate altitude additional ionization kinetics occur across the magnetic field. Narrow directed flows of ions are transformed into conics. It is shown that the high latitude boundary layer filters the velocities which lead to the dispersion of ions by masses while the plasma temperature loses its sense in this region. Measurements in the polar cusp region determine the sources of ion energizing. E.A.K.

N82-30776 Academy of Sciences (USSR), Moscow. Space Research Inst.

PECULIARITIES OF THE IONOSPHERIC ARTIFICIAL GLOW CENTER CONDITIONS OF THE BEAM PLASMA DISCHARGE IGNITION

T. G. Adeishvili, T. I. Gagua, G. G. Managadze, A. A. Alexandrov, and A. D. Maiorov 1982 12 p refs

(Rept-302) Copyright. Avail: Issuing Activity

Electrons were energy injected with electron accelerators. Gradual increase of ionospheric glow was observed, while energy accumulated by the excited states N2 and o('S) during injection. The glow appears out of the region of the direct action and is caused by ion interaction accelerated in the field of the positively charged rocket with the surrounding ionosphere. The glow intensity modulation at the moment of the beam plasma discharge ignition occurs because of decreasing rocket potential which causes accelerated ion energy. The process is amplified by the forming of additional components of quenching of the excited state o('S). E.A.K.

N82-30777 Freie Univ., Berlin (West Germany). Inst. fuer Meteorologie.

METEOROLOGICAL DATA, SERIES A MONOGRAPHS. VOLUME 2, NO. 3: DYNAMICS OF THE MIDDLE STRATOSPHERE DURING WINTER, DESCRIBED WITH THE HELP OF HOUSEHOLDER EQUATIONS FOR ANGULAR MOMENTUM AND ITS SQUARE Ph.D. Thesis [METEOROLOGISCHE ABHANDLUNGEN, SERIE A MONOGRAPHIEN. BAND 2, HEFT 3: DIE DYNAMIK DER MITTLEREN STRATOSPHAERE IM WINTER DARGESTELLT MIT HILFE DER NAUSHALTSGLEICHUNGEN FUER DEN DREHIMPULS UND SEIN QUADRAT]

Klaus Rose 1981 84 p refs In GERMAN

(ISSN-0342-4324) Copyright. Avail: Issuing Activity

The large scale turbulence of stratospheric winter circulation is treated in the framework of balances for the relative angular momentum and its square. The dynamic equation for the angular momentum is discussed. The dynamic equations for the zonal variance of the angular momentum and the square of its zonal average are deduced from the square of the angular momentum. Both equations have interaction terms. With the balance for the square of the angular momentum, more extensive statements about the atmospheric circulation structure are possible than with the angular momentum conservation law. The balance equation for the zonally averaged east-west momentum and the continuity equation were iteratively coupled enabling calculation of the middle meridional circulation. Author (ESA)

N82-30778*# Lunar and Planetary Inst., Houston, Tex.

A PROPOSAL TO CONDUCT A CARIBBEAN PLATE PROJECT INVOLVING THE APPLICATION OF SPACE TECHNOLOGY TO THE STUDY OF CARIBBEAN GEOLOGY

Geoffrey Wadge, ed. 1981 50 p refs

(Contract NASw-3389)

(NASA-CR-168502; NAS 1.26:168502; LPI-TR-81-02) Avail: NTIS HC A03/MF A01 CSCL 08G

The Caribbean plate project is designed to improve current understanding of geological resources and geological hazards within the Caribbean region. Models of mineral occurrence and

genesis (including energy resources) on a regional scale, which contribute to nonrenewable resource investigations. Models of lithospheric stress and strain on a regional scale, which contribute to forecasting geological hazards such as earthquakes and major volcanic eruptions are developed. Geological information is synthesize, and research tools provided by space technology the study of the Earth's crust are used. The project was organized in a thematic fashion, to focus on specific geological aspects of the Caribbean plate which are considered to be key factors in developing the types of models described. The project adopts a synoptic perspective in seeking to characterize the three dimensional structure, composition, state of stress, and evolution of the entire Caribbean plate. Geological information derived from analysis of space acquired data is combined with information provided by conventional methods to obtain insight into the structure, composition, and evolution of the Earth's crust. In addition, very long baseline interferometry and laser ranging techniques, which are also based upon the use of space technology, obtain information concerning crustal motion that, in turn, provides insight into the distribution and localization of crustal stress. S.L.

N82-30779*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

DOCUMENTATION OF THE SOLAR RADIATION PARAMETERIZATION IN THE GLAS CLIMATE MODEL

Roger Davies Jun. 1982 63 p refs

(NASA-TM-83961; NAS 1.15:83961) Avail: NTIS HC A04/MF A01 CSCL 04A

The parameterization of solar radiation in the Goddard Laboratory for atmospheric sciences (GLAS) general circulation model (GCM) is described. It explicitly considers the directional nature of the direct solar beam in treating radiative transfer within clouds, and in treating the effect of surface reflection. This is accomplished using delta Eddington and delta 2 stream models for the radiative transfer within isolated atmospheric layers, and by coupling the individual layers together by efficiently repeated applications of the interaction principle. Author

N82-30780# Sierra Geophysics, Inc., Redmond, Wash.

MOTIVE: FUNCTIONAL SPECIFICATIONS FOR MOMENT TENSOR INVERSION

G. R. Mellman, R. Strelitz, G. M. Lundquist, and R. S. Hart Alexandria, Va. VELA Seismological Center 2 Aug. 1981 67 p

(Contract F08606-79-C-0009; ARPA Order 2551)

(AD-A110750; SGI-R-81-039; VSC-TR-81-22) Avail: NTIS HC A04/MF A01 CSCL 08/11

This document contains the functional specifications for a program to invert for source properties using a moment tensor source description. The program structure is discussed; individual subroutines are named and their function is specified, and common blocks are named and their variables identified. Though not a final working program, these functional specifications determine the orientation, flow and interaction of the software in detail which will be exceeded only by the code itself.

Author (GRA)

N82-30781# Naval Postgraduate School, Monterey, Calif.

LOW FREQUENCY GEOMAGNETIC FLUCTUATIONS (0.025 TO 20 Hz) ON THE FLOOR OF MONTEREY BAY M.S. Thesis

Morgan P. Ames, Jr. and Louise McBane Vehslage Dec. 1981 107 p refs

(AD-A114474) Avail: NTIS HC A06/MF A01 CSCL 08/14

Two coil antennas consisting of 5460 turns of copper wire were utilized to measure the vertical component and a horizontal component of the fluctuations of the geomagnetic field on the floor of Monterey Bay at a depth of approximately seventy meters. The results indicate that the power spectral density of the fluctuations varies from 1600 nT (squared)/Hz at 0.01 Hz to 8 x 10 to the -8th power nT(squared)/Hz at 20 Hz for the horizontal component and from 320 nT(squared)/Hz at 0.01 Hz to 0.00000063 nT(squared)/Hz at 20 Hz for the vertical. Both components exhibit a monotonic decrease of about 20 dB/decade as the frequency increases, except in the 8-20 Hz region in which the Schumann resonances occur. Measurements of the power spectral density for the vertical component show relatively small excursions from average measurements as a function of wave action, while the horizontal power spectral density varies greatly throughout the day and as a function of seawater motions. Author (GRA)

N82-30782# Scripps Institution of Oceanography, La Jolla, Calif. Visibility Lab.

AIRBORNE MEASUREMENTS OF EUROPEAN SKY AND TERRAIN RADIANCES Scientific Interim Report

Richard W. Johnson Aug. 1981 36 p refs

(Contract F19628-78-C-0200; AF Proj. 6210)

(AD-A114637; SIO-82-2; AFGL-TR-81-0275; SIR-19) Avail: NTIS HC A03/MF A01 CSCL 04/1

A data set which contains nearly 500 arrays representing measurements of sky and terrain radiance values from 47 different flights is described and illustrated. The measurements were made using radiometer systems mounted on a C-130 aircraft during a series of European flights associated with the NATO program OPAQUE. Radiance measurements throughout the 4 pi field surrounding the aircraft were made in four spectral bands having mean wavelengths of 478, 557, 664, and 765 nm. Spectral sets of measurements were made at each of several altitudes between the surface and approximately 6 km AGL. Evaluation of the data illustrates good orientation and radiometric accuracies, except for stray light influences as the radiometer field of view swept near and through the solar disc. Corrective procedures are outlined and their application is undergoing further refinement. These data are appropriate for use in the development of operationally useful predictive models. The radiance data in conjunction with their companion scattering coefficient data, are readily applicable to the determination of slant path contrast transmittances, atmospheric optical depths, aerosol directional scattering characteristics, flux divergences and their attendant determinations of turbid atmospheric single scattering albedos.

GRA

N82-30783# Naval Research Lab., Washington, D. C. Environmental Plasma Physics Branch.

ENERGY LOSSES FROM HEATED AIR COLUMN Interim Report

M. Raleigh, J. R. Greig, and R. F. Fernsler 17 May 1982 18 p refs

(Contract N60921-81-WR-W0114; ARPA Order 3718; RR0110941)

(AD-A114757; NRL-MR-4556) Avail: NTIS HC A02/MF A01 CSCL 04/1

Estimates are made of the energy losses from the hot channel produced by (laser-guided) electric discharges in the atmosphere. The loss processes considered are heat conduction, continuum radiation, and line radiation. For the conditions calculated to exist in such channels (Te approx. 20,000 K, sigma (i) N (i) equal 2x10 to the 18th power c per cu.cm), the total energy loss is found to be small compared to the measured energy input (approx. 3 J/cm along the length of the channel). Therefore the assumption of negligible losses used to calculate the channeled conditions is valid and the expansion of the hot channel will be adiabatic except where compressional shock waves are involved. Since the dominant energy loss is through optically thick line radiation and this loss is strongly temperature dependent, such radiation effectively limits the temperature to which the air can be heated to approximately but less than 20,000 K.

Author (GRA)

N82-30784# Naval Research Lab., Washington, D. C. Geophysical and Plasma Dynamics Branch.

NONLINEAR EVOLUTION OF CONVECTING PLASMA ENHANCEMENTS IN THE AURORAL IONOSPHERE 2. SMALL SCALE IRREGULARITIES Interim Report

M. J. Keskinen and S. L. Ossakow 18 May 1982 33 p refs Sponsored in part by Defense Nuclear Agency

(RR0330244)

(AD-A114984; NRL-MR-4823) Avail: NTIS HC A03/MF A01 CSCL 20/9

The linear stability and nonlinear evolution of small scale density irregularities in local unstable regions of large scale convecting auroral plasma enhancements have been studied using analytical and numerical simulation techniques. Our results show that these small scale size irregularities are driven unstable

primarily by the effects of convection and field aligned currents. Furthermore, we find that the density irregularities, in the nonlinear regime, in a plane nearly perpendicular to the magnetic field, resemble steepened striation-like structures (elongated in the north-south direction for equatorward convection) which can form and cascade from kilometer to tens of meter scale sizes on the order of an hour. GRA

N82-30785# Mission Research Corp., Santa Barbara, Calif.
TECHNIQUES FOR REMOTE SENSING OF IONOSPHERIC ELECTRON DENSITY FROM A SPACECRAFT Final Report, 5 Sep. 1980 - 5 Aug. 1981
Joseph A. Ball, Gordon J. Fulks, Thomas E. Old, and William R. Wortman 5 Aug. 1981 146 p refs
(Contract F19628-80-C-0169; AF Proj. 2310)
(AD-A115398; MRC-R-668; AFGL-TR-81-0331) Avail: NTIS HC A07/MF A01 CSCL 04/1

Techniques for the remote sensing of ionospheric electron density from a satellite platform were examined. Techniques by which a more general areal survey is made to determine the electron density in three dimensions are considered. Existing techniques are reexamined for additional potential, and the feasibility of new techniques is considered. Topside sounders currently offer the best areal survey capability with the ISIS satellites. A spacecraft version of the Digisonde sounder offers enhanced measurements. Thomson scatter radars are useful in ground based installations but would be cumbersome on a satellite. Numerous optical or chemiluminescent methods are possible. They often use relatively simple equipment and, are easy to include with other detectors on a satellite system. E.A.K.

N82-30786# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
POINT MASS MODELS AND THE ANOMALOUS GRAVITATIONAL FIELD
Hans Suenkel Dec. 1981 41 p refs
(Contract F19682-79-C-0075; AF Proj. 7600)
(AD-A115216; AFGL-TR-82-0084; SR-12) Avail: NTIS HC A03/MF A01 CSCL 08/5

Single- and multi-layer continuous and discrete anomalous mass distributions and its relation to the spectrum of the anomalous gravitational field are investigated. A fast procedure for the calculation of gravity anomaly degree variances from regularly distributed point masses is outlined. Emphasis is put on the central role of Fast Fourier Transform methods on the sphere for all numerical determinations of point mass models from harmonic coefficients and/or surface gravity anomaly data.
Author (GRA)

N82-30787# California Univ., Riverside. Statewide Air Pollution Research Center.
ATMOSPHERIC CHEMISTRY OF HYDROCARBON FUELS. VOLUME 1: EXPERIMENTS, RESULTS AND DISCUSSION Final Report, Mar. 1980 - Sep. 1981
William P. L. Carter, Paul S. Ripley, Cecil G. Smith, and James N. Pitts, Jr. Tyndall AFB, Fla. AF Engineering and Services Center Nov. 1981 219 p refs
(Contract F08625-80-C-0086; AF Proj. 1900)
(AD-A115526; AFESC/ESL-TR-81-53-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 04/1

A total 132 single- and multi-day outdoor environmental chamber experiments were carried out involving nine fuels. These included the petroleum-derived JP-4 and JP-8 military aviation fuels, their shale-oil-derived analogues, unleaded gasoline, diesel No. 2 fuel, and the experimental high-energy cruise-missile fuels JP-10, RJ-4, and RJ-5. The results of this study show that the Air Force fuels JP-4 and JP-8 (both petroleum- and shale-derived) are significantly less reactive with respect to rates of oxidant formation and NO to NO2 conversion than unleaded gasoline. The cruise-missile fuels JP-10, RJ-4, and RJ-5 exhibit still lower reactivities. Under the meteorological conditions encountered during this study, the same general reactivity ranking was observed for multi-day irradiation conditions. However, under multi-day static irradiations with no further introduction of reactants, all of the military fuels studies (i.e., both kerosene-derived and high-energy) had similar maximum ozone-forming potentials.
Author

N82-30788# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Physical Sciences Branch.
LABORATORY MEASUREMENTS OF SOIL ELECTRIC PROPERTIES BETWEEN 0.1 AND 5 GHz
Allan J. Delaney and Steven A. Arcone Apr. 1982 12 p refs
(DA Proj. 4A1-61102-AT-24)
(AD-A115126; CRREL-82-10) Avail: NTIS HC A02/MF A01 CSCL 08/13

Dielectric measurements were performed on silt and sand samples from permafrost areas using Time Domain Reflectometry. The sample temperatures were varied from +25 C to -25 C, and volumetric water content was varied between oven dry and 0.55 gH20/cc. The data were processed for frequencies between 0.1 and 5.0 GHz. The results show a constant K' and a low K' for frequencies up to 1 GHz. A frequency dependence seen on the data above 2 GHz is probably the result of unfrozen, adsorbed water. At moisture levels near saturation at all temperatures, these soils have excellent propagation characteristics for ground probing radar operating below 0.3 GHz. Massive ice should be easily detectable in permafrost within a few degrees of 0 C.
Author

N82-30789# Air Force Geophysics Lab., Hanscom AFB, Mass.
MODELLING TURBULENCE IN THE LOWER ATMOSPHERE USING RICHARDSON'S CRITERION Environmental Research Papers
Edmund A. Murphy and Kathryn G. Scharr 15 Dec. 1981 53 p refs
(AD-A115244; AFGL-TR-81-0349; AFGL-ERP-759) Avail: NTIS HC A04/MF A01 CSCL 20/4

Rawinsonde wind and temperature data have been used to determine Richardson's numbers for 1 km levels between 2 km and 25 km. A critical value of the gradient Richardson number of one has been used as an indicator of the likelihood of occurrence of turbulence. The patterns in the occurrence of turbulence have been investigated for the seasons and years from 1971-1975. A regression analysis was performed on data from 21 rawinsonde stations located within the continental United States. GRA

N82-30790# Air Force Geophysics Lab., Hanscom AFB, Mass.
IONOSPHERIC MODELING Final Report
B. S. Dandekar 27 Jan. 1982 28 p refs
(AF Proj. 4643)
(AD-A115243; AFGL-TR-82-0024; AFGL-ERP-768) Avail: NTIS HC A03/MF A01 CSCL 04/2

The purpose of this report is to familiarize a user of ionospheric models with the options presently available for ionospheric prediction and specification. Two types of ionospheric models are available: the numerical-phenomenological and theoretical models. From the numerical type, the ITS-78, IONCAP, and Bent models have been discussed. In the theoretical models the main concern is the number of parameters included in the model. Nine ionoshperic models available have been summarized. The differences and limitations of these models are compared and tabulated. This information will help a user make a judicious selection of an ionospheric model to satisfy his specific needs. The sources for obtaining the programs for these models have been listed for ready reference. Author (GRA)

N82-30791# Aerodyne Research, Inc., Bedford, Mass.
EXCEDE SUPPORT STUDIES Final Report, 15 May 1980 - 15 Sep. 1981
Mark S. Zahniser, Wai Cheng, Fritz Bien, and Robert Lyons 15 Sep. 1981 74 p refs
(Contract F19628-80-C-0105; AF Proj. 2310)
(AD-A115210; ARI-RR-269; AFGL-TR-81-0257) Avail: NTIS HC A04/MF A01 CSCL 04/1

Various aspects relating to the EXCEDE artificial auroral project are discussed: (1) data from EXCEDE SPECTRA in the 4.5 to 5 micrometers region taken by infrared circular variable filters are analyzed for emission from CO, N2O, and NO+. The spectral band profile and altitude dependence of the 4.5 micrometers feature correlates with a model for NO+ chemiluminescent emission; (2) a preliminary analysis of spectra in the 12 to 22 micrometers region shows CO2 V sub 2 radiation at 15 micrometers to be the predominant feature, altitude profiles for peaks at 14 and 16 micrometers are presented; (3) the flowfield for the hypersonic wake of the EXCEDE vehicle at

lower altitudes is characterized. Intensity patterns in photographs taken with the onboard visible camera are explained in terms of bow and shock and wake shock formation and a procedure is outlined for analyzing the radiometric data in terms of this effect; (4) the long lived electron beam induced chemiluminescent trail of the Precede I experiment recorded from ground base photography has been analyzed for intensity and altitude distribution. The air afterglow reaction NO + O yields NO2 + hv, from beam produced NO and ambient atomic oxygen, is not sufficiently strong to account for the observed 10 k Rayleigh intensity. Author (GRA)

N82-30792# Mound Lab., Miamisburg, Ohio.
ORGANIC GEOCHEMISTRY OF THE EASTERN GAS SHALES
R. E. Zielinski, R. D. McIver (McIver Consultants International), and C. A. Komar (Morgantown Energy Technology Center) 1981 7 p refs Presented at the Eastern Regional Meeting of the Soc. of Petroleum Engrs. of AIME, Columbus, Ohio, 4-6 Nov. 1981
(Contract DE-AC04-76DP-00053)
(DE82-002689; MLM-2878-OP; SPE-10364; CONF-811135-1) Avail: NTIS HC A02/MF A01

A comprehensive organic geochemical study applied diagnostic geochemical characterization techniques to the shales in an effort to determine if the shales were capable of generating the quantities of gas attributed to them and to see if certain localized areas might be better ones in which to explore for reservoired hydrocarbons. The evaluation included determinations of organic matter richness, organic matter richness, organic matter origin and chemistry, and the thermal history that the rock experienced. The nature of the sediments indicates that virtually the entire area was covered with a shallow sea in which conditions were constant for long periods of time. The quality of the organic carbon in the shales, places them among the most exceptional hydrocarbon source rocks in the world and consequently the shales have in place a significant hydrocarbon resource. DOE

N82-30793# Kernforschungsanlage, Juelich (West Germany). Inst. fuer Chemie.
THE TROPOSPHERIC DISTRIBUTION OF FORMALDEHYDE Ph.D. Thesis - Cologne Univ.
D. C. Lowe, U. Schmidt, and D. H. Ehhalt Dec. 1981 109 p refs Sponsored by Deutsche Forschungsgemeinschaft and New Zealand Dept. of Scientific and Industrial Research
(Contract BMFT-FKW-25)
(JUEL-1756; ISSN-0366-0885) Avail: NTIS HC A06/MF A01

A measurement technique for determining the very low formaldehyde concentrations in clean air is described. The method is based on the standard derivation of formaldehyde with 2,4-dinitrophenylhydrazine. The derivative is separated, using high performance liquid chromatography, and detected at 254 nm with a conventional UV absorption detector. The sampling and analysis technique was used to measure tropospheric mixing ratios at various places in Europe and New Zealand as well as during a cruise in the North and South Atlantic. The results of the measurements show that formaldehyde mixing ratios in clean air are very low. In clean maritime air no significant difference in the formaldehyde mixing ratio between the hemispheres is observed. Author (ESA)

N82-30794*# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Solar-Terrestrial Research (CSTR).
SOLAR-TERRESTRIAL RESEARCH FOR THE 1980'S Final Report
Oct. 1981 159 p Sponsored in part by NASA
(Grants NSF ATM-79-20060; NA79RA-C-00121)
(NASA-CR-169258; NAS 1.26:169258; PB82-162371) Avail: NTIS HC A08/MF A01 CSCL 04A

The solar-terrestrial system is described. Techniques for observations involving all relevant platforms: spacecraft, the Earth's surface, aircraft, balloons, and rockets are proposed. The need for interagency coordination of programs, efficient data management, theoretical studies and modeling, the continuity of long time series observations, and innovative instrument design is emphasized. Examples of the practical impact of interactions between solar terrestrial phenomena and the environment, including technological systems are presented. GRA

N82-30795# Florida State Univ., Tallahassee. Dept. of Geology.
USNS ELTANIN CORE DESCRIPTIONS AND LOCATIONS, CRUISES 16-27
1981 250 p
(Contract NSF C-1059)
(PB82-161837; CONTRIB-25; ANTART-BIB-J-9288) Avail: NTIS HC A11/MF A01 CSCL 08G

Tabular data are presented on Trigger, Piston, Phleger, and Camera Phleger cores. The data include core location, depth, color, texture, and remarks. The cruises took place in the far South Pacific in the area bounded by Australia, New Zealand, southern South America and Antarctica. GRA

N82-30796# Bureau of Mines, Grand Forks, N.Dak. Research Center.
GUIDELINES FOR SELECTING SEISMIC DETECTORS FOR HIGH-RESOLUTION APPLICATIONS
C. Melvin Lepper Dec. 1981 43 p refs
(PB82-158684; BM-RI-8599) Avail: NTIS HC A03/MF A01 CSCL 08I

Thirty-five velocity detectors (geophones) and 9 accelerometers were evaluated, to provide the U.S. mining and energy industries with information in the selection of seismic detectors for high resolution applications. Velocity detectors with natural frequencies from 10 to 100 Hz were effective for seismic studies in the 5 to 600 Hz spectrum and that accelerometers were most effective in the 100 to 1,000 Hz range. Although the accelerometers described performed about equally with the better velocity detectors tested, the accelerometers showed higher output voltage levels at higher frequencies, which is an advantage. It is important that a seismic detector and its intended purpose be matched properly to achieve the intended results in high-resolution applications. There are many factors that could affect proper matching, thus careful selection of the best detector a particular application must be exercised. GRA

N82-30797# Bureau of Mines, Grand Forks, N.Dak. Research Center.
MONITORING GROUND MOVEMENTS NEAR CAVING STOPES: METHODS AND MEASUREMENTS
Louis A. Panek and Willard J. Tesch Dec. 1981 117 p
(PB82-160276; BM-RI-8585; LC-81-607799) Avail: NTIS HC A06/MF A01 CSCL 08I

Rock-mass movements above the undercutting level in a block caving mine were measured by means of instrumentation installed in drifts and in long drill holes several hundred feet ahead of the approaching panel caving. The instruments included a borehole inclinometer probe to determine the change of profile along a cased drill hole, break-detection cables monitored by time domain reflectometry to determine the locations of new cracks, multiple anchor position extensometers to measure longitudinal ground movements in boreholes, cross drift extensometer rosettes to measure the amount and direction of deformation in planes normal to the drift axis, and tiltmeters to determine the change of profile along the drift. Installation and operation of the instruments for this application are described in detail and their comparative advantages are discussed. Author (GRA)

N82-30798# Geological Survey, Menlo Park, Calif.
MULAP3: A MULTI-LINEAR ANALYSIS PROGRAM FOR GROUND MOTION STUDIES OF HORIZONTALLY LAYERED SYSTEMS Final Report
Albert T. F. Chen Nov. 1981 50 p refs
(PB82-160425; USGS/GD-82-001) Avail: NTIS HC A03/MF A01 CSCL 08K

A computer program that analyzes the nonlinear, seismic response of horizontally layered systems is presented. In comparisons with previous MULAP versions, the present program has the additional features of incorporating a slip mechanism for the simple MAsing soil model and considering modulus degradation of soils with no strength reduction. Organizational features and various options of the program are described. The use of the program is illustrated. FORTRAN listing and sample input/output are also included. GRA

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-30799*# Nova Univ., Dania, Fla. Satellite Surface Stress Working Group.

SCIENTIFIC OPPORTUNITIES USING SATELLITE SURFACE WIND STRESS MEASUREMENTS OVER THE OCEAN

Jun. 1982 163 p refs

(Contract NAS5-26714)

(NASA-CR-169248; NAS 1.26:169248) Avail: NTIS HC A08/MF A01 CSCL 04B

Scientific opportunities that would be possible with the ability to collect wind data from space are highlighted. Minimum requirements for the space platform and ground data reduction system are assessed. The operational uses that may develop in government and commercial applications of these data are reviewed. The opportunity to predict the large-scale ocean anomaly called El Nino is highlighted. N.W.

N82-30800# Ohio Univ., Athens. Avionics Engineering Center.

EVALUATION OF THE FAA/MITRE WEATHER DATA DEVICE Final Report

Delmar G. Pullins Washington FAA Jan. 1982 59 p refs

(Contract DTFA01-81-C-10007)

(AD-A114646; OU/AEC/EER-54-1; DOT-FAA-RD-82-14) Avail: NTIS HC A04/MF A01 CSCL 04/2

A cockpit weather display unit was evaluated. Twenty subject pilots were flown using prerecorded weather information, and real time weather information from the Columbus weather radar. The airborne system consists of a VOR Receiver, a processor unit, a control module, and a hardcopy printer that provides the pilot with ground weather radar information in the cockpit upon demand. It is found that providing the pilot with a low cost, real time radar weather information source, will be a distinct factor in reducing unnecessary radio transmissions, controller workload, and will aid the pilot in decision making. The installation of such a unit in the cockpit would eliminate errors due to verbal communication of the weather picture, provide useful information, and directly attack the major problem of aviation thunderstorm avoidance. E.A.K.

N82-30801# Science Applications, Inc., Monterey, Calif.

TROPICAL CYCLONE WIND PROBABILITY FORECASTING FOR THE EASTERN NORTH PACIFIC (EPWINDP) Final Report

Jerry D. Jarrell Apr. 1982 22 p refs

(Contract N00228-81-C-H381; Proj. W0513)

(AD-A114532; SAI-PN-1-425-08-453; NEPRF-CR-82-06) Avail: NTIS HC A02/MF A01 CSCL 04/2

The development of a model to estimate 30 and 50 kt wind probabilities from tropical cyclone forecasts is described. The model is based on position forecast errors, which are used to determine the probability of a cyclone occupying a particular geographical position, and on wind profile errors. Wind profile errors consist of errors in the forecast maximum wind and errors in the forecast radius of 30 and 50 kt winds. The profile errors are used to estimate the probability of 30 to 50 kt winds occurring at a point, given that the tropical cyclone occupies a particular position. These position and wind probability elements are combined by using an assumption of independence which was supported by correlation coefficients in an earlier work. The model, which includes features of the earlier strike probability model and an Atlantic Ocean wind probability model, is tested on independent data. Test results are shown to illustrate good agreement between forecast and probability and the frequency of occurrence of 30 to 50 kt winds. Author (GRA)

N82-30802# Aeronautical Research Associates of Princeton, Inc., N. J.

A. R. A. P'S MODEL FOR THE ATMOSPHERIC MARINE ENVIRONMENT Final Report, 12 Nov. 1980 - 18 Sep. 1981

W. S. Lewellen, D. A. Oliver, and R. I. Sykes Monterey, Calif. Naval Environmental Prediction Research Facility Jan. 1982 180 p refs

(Contract N00019-80-C-0617; WF59551)

(AD-A115027; ARAP-457; NEPRF-CR-82-02) Avail: NTIS HC A09/MF A01 CSCL 04/2

This report presents the results for the past year's developments for computing the detailed low-level atmospheric distribution of velocity, temperature, moisture, refractive index, and the turbulent variances of these quantities. A critical review of the present status of the model is presented along with results of new calculations. A calculation of fog evolution is presented to show a cold-water fog evolving into a warm-water fog as a result of radiational cooling. The evolution of breaking Kelvin-Helmholtz waves is also followed in a series of calculations which should lead to a better understanding of the dynamics of the inversion layer at the top of the atmospheric boundary layer. Detailed derivations of two proposed extensions to the model are presented. One involves a hybrid integral-differential description to permit approximate solutions to be obtained with less numerical effort, and the second involves the incorporation of precipitation into the two-phase representation of water in the atmospheric. Author (GRA)

N82-30803# Naval Oceanography Command Detachment, Asheville, N.C.

CLIMATIC STUDY OF THE MALACCA AND SUNDA STRAITS, NEAR COASTAL ZONE

Apr. 1982 198 p refs

(AD-A115323) Avail: NTIS HC A09/MF A01 CSCL 04/2

This climate study consists of monthly charts and tables (1) visibility, (2) ceiling-visibility (low), (3) ceiling-visibility (mid-range), (4) scalar mean wind speed, (5) wind speed < 11 and $<$ or $=$ 34 kts, (6) wind speed 11-21 and 22-23 kts, (7) surface wind roses, (8) air and sea temperature, (9) wave height isopleths, (10) wave height tables and (11) surface currents (seasonal). Author (GRA)

N82-30804# National Oceanic and Atmospheric Administration, Norman, Okla. National Severe Storms Lab.

FIELD PROGRAM OPERATIONS: TURBULENCE AND GUST FRONT Final Report, Mar. 1980 - Dec. 1980

J. T. Lee and R. J. Doviak Washington FAA Nov. 1981 43 p

(Contract DTFA01-80-Y-10524)

(AD-A115447; DOT-FAA-RD-81-108) Avail: NTIS HC A03/MF A01 CSCL 04/2

Aircraft, rawinsonde network, mesoscale surface network, low-level wind shear alert system at Will Rogers World Airport, 444 m instrumented tower and satellite observations augmented a conventional weather radar and a new, dual Doppler weather radar system to obtain concurrent data on weather hazards to aircraft. Storm days and data acquired are detailed. An objective was to determine the characteristics and detectability of turbulence, wind shear and other aircraft operational weather hazards using indirect (radar) probes. The South Dakota School of Mines T-28 aircraft and the National Aeronautics and Space Administration's F-106 aircraft made thunderstorm penetrations during Doppler radar and lightning operations. Data obtained are discussed, and the analysis of a turbulence case and two gust front cases is presented. Author

N82-30805# Naval Postgraduate School, Monterey, Calif. Dept. of Meteorology.

APPLICATION OF QUASI-LAGRANGIAN DIAGNOSTICS AND FGGE DATA IN A STUDY OF EAST COAST CYCLOGENESIS M.S. Thesis

Donald A. Roman Sep. 1981 90 p refs

(AD-A115250) Avail: NTIS HC A05/MF A01 CSCL 04/2

This synoptic study of an explosive deepening event, the President's Day Storm of 17-20 February 1979, introduces and examines the Level III-b FGGE data in an oceanic storm. It applies the quantitative quasi-Lagrangian diagnostics techniques to both the FGGE data for a 48-hour period and a 24-hour LFM II prediction. Using a mass budget analysis in isobaric coordinates, the mass structure and circulation intensity are examined and intercomparisons between the FGGE observed cyclone and the LFM model predictions are made. Destabilization that is found during cyclogenesis is a maximum during the early time periods. The LFM fields did not develop the intensity, strength,

or depth of circulation that is found in the observed FGGE data. This may be linked to a poor representation of the diabatic processes in the LFM model. Author (GRA)

N82-30806# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.

A SURVEY OF MELTING LAYER RESEARCH

Robert C. Schaller, Ian D. Cohen, Arnold A. Barnes, Jr., and Lawrence C. Gibbons 4 Jan. 1982 105 p refs
(AF Proj. 2310)
(AD-A115224; AFGL-TR-82-0007; AFGL-AFSG-438) Avail: NTIS HC A06/MF A01 CSCL 01/3

This report summarizes previous melting-layer research both within and outside AFGL and provides recommendations for future research in the melting layer. An extensive literature search provided a bibliography of previous research. This bibliography is included as an appendix. Several definitions of the top and bottom of the melting layer are presented and discussed. Aggregation and breakup appear to be the chief microphysical processes that determine the particle-size spectrum of snow and ice that enter the melting layer. Studies of the actual melting process and of the melting layer as seen by radar are presented. Microphysical and thermodynamic characteristics are discussed. Dynamic considerations are mentioned. Previously gathered aircraft data are reviewed, and recommendations are made for future aircraft and radar data-gathering efforts. Author (GRA)

N82-30807# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

TEMPERATURE ERRORS ON RADIOSONDE RKZ-2 AND ITS WORKING PROCEDURE

O. V. Marfenko 7 May 1982 15 p refs Transl. into ENGLISH from Tr. Tsent. Aerol. Observ., Metody i Tekh. Eksperim. Issled. Atm. (USSR), no. 102, 1971 p 11-19
(AD-A115396; FTD-ID(RS)T-0542-82) Avail: NTIS HC A02/MF A01 CSCL 04/2

The errors in measuring temperature with radiosonde RKZ-2 was studied. The error in temperature measurement by radiosonde type RKZ consists of the error caused by the thermistor and the error caused by the radio component. The main error contributed by the radio component was emphasized. The reproducibility of the radio component readings under normal conditions (room temperature, ground pressure and nominal supply conditions were considered. The additional error which originates during the deviation of the supply conditions of the radio component up to the maximum permissible values was also considered. The change in the radiosonde readings through time was studied in order to determine the useful life of the radiosonde. GRA

N82-30808# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

PRELIMINARY DISCUSSION OF CLIMATE EFFECTS WHICH MAY ARISE FROM THE DONGXIAN IRRIGATION PROJECT IN REROUTING WATER FROM SOUTH TO NORTH

Hongzhou Li, Zhen Zhangzhou, and Zeng Zhaomei 5 May 1982 10 p refs Transl. into ENGLISH from Kexue Tongbao (China), no. 11, 1980 p 505-508
(AD-A115386; FTD-ID(RS)T-1310-81) Avail: NTIS HC A02/MF A01 CSCL 04/2

The climatic effects of irrigation systems are considered. The mechanism governing changes in sensible heat fields is investigated. Author

N82-30809# National Oceanic and Atmospheric Administration, Oak Ridge, Tenn. Atmospheric Turbulence and Diffusion Lab.

ANALYSIS OF WANGARA MICROMETEOROLOGY: SURFACE STRESS, SENSIBLE HEAT, EVAPORATION, AND DEWFALL

B. B. Hicks Jun. 1981 41 p refs
(Contract DE-AI05-76EV-03688)
(DE82-004719; ERLTM-ARL-104) Avail: NTIS HC A03/MF A01

Eddy fluxes and gradients were used to derive values of the sensible heat flux and friction velocity appropriate to the general area of the Wangara experiment rather than to the considerably smoother central site. Friction velocities appear to be considerably greater than those developed in previous studies of the Wangara data set. Sensible heat fluxes are similar during daytime, but differ greatly from other estimates for night. Dewfall evaluations indicate a total of about 9 mm during the experiment; condensation occurred at rates that sometimes approached but rarely exceeded the theoretical maximum rate of about 0.07 mm/h. Maximum dewfall occurred under clear skies and in moderate winds. DOE

N82-30810# Stockholm Univ. (Sweden). Dept. of Meteorology.

ON THE EXISTENCE OF SOLUTIONS TO MACHENHAUER'S NONLINEAR NORMAL MODE INITIALIZATION

Lennart Thaning 12 Mar. 1982 44 p refs
(Contracts SWED-NSRC-G-UR-2923-101; SWED-NSRC-G-GU-2923-103)
(DM-36) Avail: NTIS HC A03/MF A01

Machenhauer's normal mode initialization scheme was examined in a low order version of a shallow water model on an equatorial beta plane. The model contains one Rossby mode and two gravity modes. It is shown that, generally, there is more than one state satisfying the initial conditions. Only one is accepted as a realistic initial state. Without nonadiabatic forcing, the iterative nonlinear normal mode procedure converges only to the realistic initial state. When the Rossby amplitude is increased beyond a critical value, the realistic initial state ceases to exist. The critical value of the Rossby amplitude decreases when the fluid becomes shallower. Nonadiabatic forcing also violates the existence of the realistic initial state. The critical forcing decreases with decreasing fluid depth. Author (ESA)

N82-30811# Stockholm Univ. (Sweden). Dept. of Meteorology.

THE INCLUSION OF NONZERO TENDENCIES OF THE GRAVITY MODES IN THE NORMAL MODE PROCEDURE

Lennart Thaning 25 Mar. 1982 26 p refs
(Contracts SWED-NSRC-G-UR-2923-101; SWED-NSRC-G-GU-2923-103)
(DM-37) Avail: NTIS HC A03/MF A01

A low order version of a shallow water model on an equatorial beta plane was used to estimate the effects of nonzero gravity amplitudes in the nonlinear normal mode initialization procedure. Initial values of gravity tendencies are determined by: (1) using tendencies given by second approximation in the Baer-Tribbia scheme; (2) iteratively adjusting tendencies so that one step integration produces the same gravity amplitudes as a reinitialization after one time step and; (3) assuming a sinusoidal variation in time of the gravity amplitudes. It is shown that initial nonzero gravity tendencies give significantly smoother evolution than the zero case. Smoothest evolution is obtained with (2), for a small value of the depth of the fluid and for a large value, when external forcing is included. Including external forcing in the Machenhauer procedure significantly reduces high frequency oscillations. Author (ESA)

N82-30812# Stockholm Univ. (Sweden). Dept. of Meteorology.

SOME ASPECTS OF NONLINEAR NORMAL MODE INITIALIZATION, USING A SIMPLE SPECTRAL SHALLOW WATER MODEL ON THE MIDLATITUDE BETA PLANE

22 Mar. 1982 37 p refs
(Contracts SWED-NSRC-G-UR-2923-101; SWED-NSRC-G-GU-2923-103)
(DM-30) Avail: NTIS HC A03/MF A01

A spectral shallow water model for wind divergence with only longitudinal dependence is presented. It was used for experiments concerning convergence problems when solving for nonlinear normal mode initialization. For a given kinetic energy level of the meteorological modes, the lack of convergence in shallower fluids, is due to the interaction between gravity modes. The iterative method normally used converges to the solution. The effect of linear forcing was studied. For deeper fluids, linearizing around the forcing when using performing nonlinear normal mode initialization is better than letting the forcing act together with the advection terms. For shallower fluids this approach is less effective. Author (ESA)

N82-30813# Weiss Technik G.m.b.H., Reiskirchen (West Germany).

DEVELOPMENT OF AN IMPROVED CONTINUOUS MEASUREMENT SYSTEM FOR ATMOSPHERIC MOISTURE WITH ELECTRICAL OUTPUT SIGNAL Final Report, Mar. 1980

Reinhard Koerber and Lothar Saeemann Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 65 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-054; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,50

The possibility of developing an aspiration psychrometer for continuous measurement of humidity in air was investigated. The original aim of adiabatically cooling the sensor in function of humid temperature was abandoned. However, an apparatus was constructed whose most prominent features are reproducibility of measurement results and of dwell time of the wick. The actual humid temperature or the relative humidity is calculated from the values of the psychrometer by means of an electronic computing circuit. The application range of the psychrometer varies from 5 to 100 C with a relative humidity of 10% to 95%. Author (ESA)

N82-30814# National Weather Service, Salt Lake City, Utah. Scientific Services Div.

AN ENHANCED PLOTTER FOR SURFACE AIRWAYS OBSERVATIONS

Andrew J. Spry and Jeffrey L. Anderson Oct. 1981 33 p

(PB82-153883; NOAA-TM-NWS-WR-170; NOAA-81111607) Avail: NTIS HC A03/MF A01 CSCL 04B

An enhanced plotter which consists of two programs used to generate plot files from surface airways observations is discussed. The two programs, along with some modifications to the SAO decoder, provide the following enhancements over previous plotting programs: (1) plotting on either the United States or North America map background; (2) plotting most parameters in their correct station model positions; (3) plotting single parameters; (4) highlighting significant weather using the GDM zoom capabilities; (5) producing additional plots from an SAODATA file quickly; (6) running the SAO decoder and plotter in a procedure; and (7) using an edited sation directory file to reduce clutter. GRA

N82-30815# National Meteorological Center, Washington, D.C.

THE LFM-11 MODEL - 1980

John E. Newell and Dennis G. Deaven Sep. 1981 27 p refs

(PB82-156845; NOAA-TM-NWS-NMC-66; NOAA-81102003) Avail: NTIS HC A03/MF A01 CSCL 04B

The changes incorporated in the LFM model since the end of 1976 are documented. The computational grids used by the model and on its vertical structure are emphasized. The calculation of convective precipitation and the vertical interpolation from the model's coordinate to isobaric surfaces for display purposes are treated. the circulation and precipitation forecasts of the LFM are evaluated by presenting monthly values of S1 scores and of threat scores for the years 1976 through 1979. GRA

N82-30816# National Oceanic and Atmospheric Administration, Miami, Fla. Oceanographic and Meteorological Labs.

TROPICAL CYCLONE MODIFICATION: THE PROJECT STORMFURY HYPOTHESIS

Robert C. Sheets Aug. 1981 59 p refs

(PB82-164419; NOAA-TR-ERL-414; AOML-30; NOAA-81120316) Avail: NTIS HC A04/MF A01 CSCL 04B

The Project Stormfury modification theory, its physical basis, and the experiment design are described. The possible effects of experiments on tropical cyclone motion, rainfall, wind fields, and storm surge are examined. GRA

N82-30817# National Academy of Sciences - National Research Council, Washington, D. C. Inst. for Disaster Research.

THE KALAMAZOO TORNADO OF MAY 13, 1980

Kishor C. Mehta, James R. McDonald, Richard D. Marshall (NBS), James J. Abernethy (Lawrence Inst. of Technology), and Daryl Boggs, Jr. (WJE Consulting Engineers, Chicago, Ill.) Jun. 1981 66 p refs

(Grant NSF PFR-78-10631)

(PB82-162454; CCS-CND-016) Avail: NTIS HC A04/MF A01 CSCL 04B

The tornado and its implications that moved through the city of Kalamazoo, Michigan, on May 13, 1980. The tornado exposed a wide variety of old and new buildngs to high winds and windblown debris. The responses of many types of structures to tornado conditons, and to evaluate the intensity of the near surface tornadic winds are studied. GRA

N82-30818# Western Weather Consultants, Inc., Durango, Colo.

HIPLEX WEATHER MODIFICATION RESEARCH SUPPORT PROVIDED AT MILES CITY, MONTANA Final Report, 15 Mar. 1978 - 30 Sep. 1981

Curtis L. Hartzell and Terry C. Jameson 31 Oct. 1981 110 p refs

(Contract DI-8-07-83-V0010)

(PB82-161803; WWCI/FR-43-08) Avail: NTIS HC A06/MF A01 CSCL 04B

Meteorological observation and forecasting support services for weather modification and convective precipitation research at Miles City, Montana, during the summers of 1978, 1979, 1980 and 1981 were reported. The services consist of operating rawinsonde equipment to obtain atmospheric soundings, assisting with the operation of a 5.4 cm digital radar system, preparing daily operational weather forecasts, maintaining a weather watch for the experimental area, and compiling the data collected for dissemination to other groups. GRA

N82-30819# National Oceanic and Atmospheric Administration, Washington, D. C. Federal Coordinator for Meteorological Services and Supporting Research.

NATIONAL WINTER STORMS OPERATIONS PLAN

William S. Barney Oct. 1981 61 p

(PB82-158700; FCM-P13-1981; NOAA-81103014) Avail: NTIS HC A04/MF A01 CSCL 04B

Weather observations for use in predicting and providing adequate and timely warnings of severe and crippling winter storms along the East Coast of the United States to the Gulf of Mexico were described. The Plan covers that part of the year (November 1 to April 15) with a relatively high incidence of winter storms along the East and Gulf Coasts. New reconnaissance tracks are designed for the East Coast, and buoy and satellite information is updated. E.A.K.

N82-30820# National Oceanic and Atmospheric Administration, Boulder, Colo. Weather Modification Program Office.

EVALUATION OF A METEOROLOGICAL AIRBORNE PULSE DOPPLER RADAR

B. L. Trotter, R. G. Strauch, and C. L. Frush (National Center for Atmospheric Research) Jul. 1981 65 p

(PB82-156860; NOAA-TM-ERL-WMPO-45; NOAA-81103011) Avail: NTIS HC A04/MF A01 CSCL 04B

Doppler measurements installed in the aircraft which measure the radial velocities in light to heavy precipitation and in nonturbulent to turbulent meteorological situations was evaluated. The base line noise level in the system increased whenever video returns were present. The minimum detectable signal at the system output was approximately minus 100 dBm. It is shown that the system can be used in an airborne environment. Errors in velocity measurements will occur if the exact antenna spacial pointing angle is not known. The magnitude of error in the measurement is a function of the error in the known antenna position and the ground speed of the aircraft. GRA

N82-30821# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Analysis and Prediction Div.

NORMAL MODES OF AN ATMOSPHERIC PREDICTION MODEL Final Report

James A. Sethian, Dale Durran, Dick Dee, and David L. Williamson Dec. 1981 55 p refs

(Grant NSF ATM-77-23757)

(PB82-168980; NCAR/TN-186) Avail: NTIS HC A04/MF A01 CSCL 04B

The discrete normal modes of a grid point model are given for forecast studies. The linearization about a state of rest and

separation of variables are described. The modes of this model are found and compared with those of other models. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-30822 Institute of Oceanographic Sciences, Wormley (England). Wave Energy Steering Committee.
COMPARISONS OF THE METEOROLOGICAL OFFICE AND NORSWAM WAVE MODELS WITH MEASURED WAVE DATA COLLECTED DURING MARCH 1980
J. A. Ewing, J. J. Ephranus (Meteorol. Office, Bracknell, England), B. W. Golding (Meteorol. Office, Bracknell, England), and B. A. Worthington (Hydraulics Research Station, Wallingford, England) 1981 37 p refs Sponsored by UK Dept. of Energy
(IOS-127) Copyright. Avail: Issuing Activity

A parametrical wave model, used to hindcast extreme value wave heights for severe storms over a 10 yr period (NORSWAM), and a source function model for routine wave prediction, used to estimate average monthly wave power, were tested. The models were used continuously for 1 month with the same input wind field. Model results were compared with wave height and wave power estimates derived from wave measurements at five stations. Both models agree well with measurements. Wave prediction accuracy depends on how well the wind field is specified.
Author (ESA)

N82-30823*# Analytic Sciences Corp., Reading, Mass.
NOSS ALGORITHM SPECIFICATIONS FOR OCEAN CURRENT MAPPING, VOLUME 1
James V. White Jul. 1982 45 p refs 2 Vol.
(Contract NAS6-3163)
(NASA-CR-156886-Vol-1; NAS 1.26:156886-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 08C

National Oceanic Satellite System (NOSS) algorithm specifications for ocean current mapping are provided. The signal-processing theory on which the algorithms are based is summarized. Author

N82-30824*# Analytic Sciences Corp., Reading, Mass.
NOSS ALGORITHM SPECIFICATIONS FOR OCEAN CURRENT MAPPING, VOLUME 2
James V. White Jul. 1982 108 p refs 2 Vol.
(Contract NAS6-3163)
(NASA-CR-156886-Vol-2; NAS 1.26:156886-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 08C

The development of National Oceanic Satellite System (NOSS) algorithms for ocean current mapping and the verification of algorithm performance with SEASAT-A radar altimeter data is described. Author

N82-30825# RAND Corp., Santa Monica, Calif.
THE RELATION BETWEEN THE SEMIDIURNAL TIDE IN THE EASTERN SCHELDT AND ITS OVERTIDES
Jan J. Leendertse Apr. 1982 67 p refs Sponsored by Netherlands Rijkswaterstaat
(RAND/N-1787-NETH) Avail: NTIS HC A04/MF A01

An analysis of a 16-day record of water levels at stations in the Eastern Scheldt was conducted. It was found that the semidiurnal tidal amplification is strongly dependent on its tidal heights (tidal range). The lag of the semidiurnal tide is also influenced by the tidal range. The quarter-diurnal tidal range in the main part of the Eastern Scheldt increases nearly linearly with the range of the semidiurnal tide over the range from neap tide to spring tide. Proportionally, the quarter-diurnal tide increases much faster than the semidiurnal tide. This is not the case in the Volkerak where the quarter-diurnal tidal range decreases with increasing semidiurnal tide when the semidiurnal tidal range is larger than the average range. The sixth-diurnal tidal range increases also, nearly linearly, with the range of the semidiurnal tide except at Bruinisse, which is close to a node in the system. Genrally, the sixth-diurnal tidal range increases faster than the semidiurnal tidal range. B.W.

N82-30826# Naval Postgraduate School, Monterey, Calif.
AN APPLICATION OF A NUMERICAL SEA ICE MODEL TO THE EAST GREENLAND AREA M.S. Thesis
Walter B. Trucker, III Dec. 1981 110 p refs
(AD-A114453) Avail: NTIS HC A06/MF A01 CSCL 08/12

A dynamic thermodynamic sea ice model which employs a viscous plastic constitutive law was applied to the East Greenland area. The model was run on a 40 km spatial scale at 1/4-day time steps for a 60-day period with forcing data beginning on 1 October 1979. The model predicts reasonable thicknesses and velocities within the ice margin. Thermodynamic ice growth produces excessive ice extent, however, probably due to inadequate parameterization of oceanic heat flux. Ice velocities near the free ice edge are also not well simulated, and prliminary investigations attribute this to an improper wind field in this area. A simulation which neglects ice strength, effectively damping ice interaction with itself and allowing no resistance to deformation, produced excessive ice drift toward the coast and results in unrealistic nearshore thickness. a dynamics only simulation produced reasonable results including a more realistic ice extent, but the need for proper thermodynamics is also apparent. Other simulations verify that ice import from the Arctic Basin, and ice transport due to winds and currents, were also important components in the model studies. Author

N82-30827# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Ocean Science and Technology Lab.
GEOACOUSTIC MODELS FOR THE STRAITS OF SICILY AND SARDINIA-TUNISIA
J. E. Matthews Apr. 1982 76 p refs
(AD-A115294; NORDA-TN-99) Avail: NTIS HC A05/MF A01 CSCL 20/10

This publication documents the derivation of geoacoustic models for the Straits of Sicily and Sardinia-Tunisia. The geologic description of the region is based upon published geological/geophysical papers and archive data. The zone of primary concern is the first few hundred meters below the sea floor, which, in the present case, consists of unlithified Quaternary-Pliocene sediments. Lying below this upper layer is acoustic basement, which consists of Miocene chalks and limestones or evaporities. The modeling procedures developed by E. L. Hamilton were then used to estimate the physical properties of these sediment types. Finally, bottom loss as a function of grazing angle at a variety of frequencies was computed for the sea floor models.
Author (GRA)

N82-30828# Science Applications, Inc., McLean, Va.
ESTIMATES OF YVETTE MEASUREMENT ERROR
F. C. Newman, E. J. Molinelli, and S. L. Patterson Apr. 1982 47 p refs
(Contract N00014-81-C-0075)
(AD-A115384; SAI-82-497-WA; OPD-TR-81-201-07) Avail: NTIS HC A03/MF A01 CSCL 08/10

YVETTE is a free-fall instrument package which measures temperature, conductivity, pressure, and horizontal velocity in the upper ocean. From the direct measurements, the density, rho, and gradient (or differenced) quantities such as Brunt-Vaisala frequency, N=-(g/rho) (partial derivative rho/partial derivative z), and the square of the vertical shear, S squared=(partial derivative u/partial derivative z) squared +(partial derivative v/partial derivative z) squared, can be calculated. Data from YVETTE have been used to determine empirical relations between N squared and S squared, and variations in these relations among different oceanographic regions. The purpose of this report is to address questions that have arisen as to the reliability of the measurements and the ensuing analyses. Sources on noise in the measurements are identified and the noise magnitudes are estimated. Estimates of noise in the calculated values of N squared and S squared are made based on an expression derived by Gregg (1979). It is concluded that the shear characterizations, the N squared/S squared relations, and other conclusions reached to date are not affected by the noise errors described here. Some estimates of the wavenumber limits of these analyses are also made. GRA

N82-30829# Alabama Univ., University. Bureau of Engineering Research.
HYDRODYNAMICS OF MOBILE BAY AND MISSISSIPI

SOUND PASS EXCHANGE STUDIES M.S. Thesis
John P. Jarrell Jul. 1981 300 p refs Sponsored in part by Mississippi-Alabama Sea Grant Consortium
(PB82-161019; BER-271-112; MASGP-80-023; NOAA-81111605) Avail: NTIS HC A13/MF A01 CSCL 08C

The development of a mathematical model of Mobile Bay and East Mississippi Sound, Alabama, capable of describing the hydrodynamics in Pass aux Herons and Main Pass was investigated. The WES implicit flooding model, version of (WIFM II) is applied to the Mobile Bay-East Mississippi Sound system. This model is suitable because of the implicit solution format and variable grid size capabilities which it possesses. Calibration and verification of the model with available field data are reported.
GRA

N82-30830# Environmental Research Inst. of Michigan, Ann Arbor. Applications Div.
REMOTE BATHYMETRY WITH A MULTISPECTRAL ACTIVE/PASSIVE AIRBORNE SYSTEM Final Report, 1980 - May 1981
D. R. Lyzenga, J. S. Ott, J. P. Livisay, and F. C. Polcyn Feb. 1982 87 p refs
(Contract N61331-80-C-0022)
(AD-A115099; AD-F200026; ERIM-149600-1-F) Avail: NTIS HC A05/MF A01 CSCL 08/10

Active/passive multispectral data collected at 1000 ft to 10,000 ft altitudes in the Bahamian Calibration Area were processed in order to construct bathymetric charts and images of the bottom reflectance. Preprocessing methods were developed to correct for sunglint and atmospheric attenuation effects as a function of scan angle. While depth charts can be made with ship measured control points as well as band ratio techniques, lidar time differences measured at 1000 ft altitude were found to be the best source of water depth calibration input data needed to identify parameters for extrapolation of water depth measuring techniques to higher altitudes. Author (GRA)

N82-30831# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
TSUNAMI RESEARCH OPPORTUNITIES, AN ASSESSMENT AND COMPREHENSIVE GUIDE
E. Bernard and Richard Goulet (NSF) Sep. 1981 59 p refs Sponsored in part by NSF
(PB82-156662; NSF/PAG-81001) Avail: NTIS HC A04/MF A01 CSCL 08C

Forecasting tsunami dangers and evaluating coastal tsunami hazards are outlined. The nature of tsunamis, their impact on United States coastal areas, and progress made in forecasting ability since 1960 is described. Tsunamigenic earthquakes and tsunami generation, propagation, terminal effects, instrumentation, warning systems, social response and risk are studied GRA

N82-30832# Delaware Univ., Newark. College of Marine Studies.
A DRIFTER STUDY OF THE LAGRANGIAN MEAN CIRCULATION OF DELAWARE BAY AND ADJACENT SHELF WATERS M.S. Thesis
Edwin Henry Pape, III Dec. 1981 169 p refs
(PB82-156811; NOAA-81100903; DEL-SG-18-81) Avail: NTIS HC A08/MF A01 CSCL 08C

To document the Lagrangian mean circulation of Delaware Bay and adjacent shelf waters, a series of nine deployments of surface and seabed current drifters was made. The presence of classical estuarine circulation in Delaware Bay can be inferred from maps of the apparent drifter trajectories. The seaward surface residual flow in the Bay is directed towards the Delaware shore, consistent with Coriolis effects, while the bottom residual flow moves upstream in the deep channels of the Bay and then spreads laterally onto the adjacent shallower areas on both sides. The estuarine circulation extends onto the adjacent shelf.
Author (GRA)

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-30833*# Massachusetts Inst. of Tech., Cambridge.
PROCEEDINGS OF THE SIXTEENTH ANNUAL CONFERENCE ON MANUAL CONTROL
1980 643 p refs Conf. held at Cambridge, Mass., 5-7 May 1980 Sponsored by NASA. Ames Research Center
(NASA-CR-169243; NAS 1.26:169243) Avail: NTIS HC A99/MF A01 CSCL 05H

Operator modeling is reviewed. Measurement of human response is considered. Pilot/operator opinion is also considered. The effects of motion are reviewed. Aircraft displays are discussed. Supervisory control is considered. Automobile driving and remote manipulation are also considered. For individual titles, see N82-30834 through N82-30870.

N82-30834*# Illinois Univ., Chicago. Coll. of Engineering.
MODELING OF HUMAN OPERATOR DYNAMICS IN SIMPLE MANUAL CONTROL UTILIZING TIME SERIES ANALYSIS c54
Gyan C. Agarwal, Frank Osafo-Charles, William D. Oneill, and Gerald L. Gottlieb *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 1-28 refs Prepared in cooperation with Rush-Presbyterian-Saint Luke's Medical Center, Chicago, Ill. (For primary document see N82-30833 21-51)
(Grants NSF ENG-76-08754; NS-00196; NS-12877)
Avail: NTIS HC A99/MF A01 CSCL 05H

Time series analysis is applied to model human operator dynamics in pursuit and compensatory tracking modes. The normalized residual criterion is used as a one-step analytical tool to encompass the processes of identification, estimation, and diagnostic checking. A parameter constraining technique is introduced to develop more reliable models of human operator dynamics. The human operator is adquately modeled by a second order dynamic system both in pursuit and compensatory tracking modes. In comparing the data sampling rates, 100 msec between samples is adequate and is shown to provide better results than 200 msec sampling. The residual power spectrum and eigenvalue analysis show that the human operator is not a generator of periodic characteristics. Author

N82-30835*# Systems Research Labs., Inc., Dayton, Ohio.
A GUNNER MODEL FOR AN AAA TRACKING TASK WITH INTERRUPTED OBSERVATIONS c54
C. F. Yu, K. C. Wei, and M. M. Vikmanis (Aerospace Medical Research Lab.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 29-39 refs (For primary document see N82-30833 21-51)
(Contract F33615-79-C-0500)
Avail: NTIS HC A99/MF A01 CSCL 05H

The problem of modeling a trained human operator's tracking performance in an anti-aircraft system under various display blanking conditions is discussed. The input to the gunner is the observable tracking error subjected to repeated interruptions (blanking). The effect of blanking on the gunner's tracking performance is modeled via the observer and controller gains.
Author

N82-30836*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
MODELING HUMAN TARGET ACQUISITION IN GROUND-TO-AIR WEAPON SYSTEMS c54
A. V. Phatak, R. L. Mohr, M. M. Vikmanis (Aerospace Medical Research Lab.), and K. C. Wei (Systems Research Lab., Dayton Ohio) *In* MIT Proc. of the 16th Ann. Con. on Manual Control 1980 p 40-48 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

Several models were developed for describing human operator input-output behavior in ground-to-air target tracking tasks. The problems associated with formulating and validating mathematical models for describing and predicting human target acquisition response are considered. The extension of the human observer model to include the acquisition phase as well as the tracking segment is presented. Relationship of the observer model structure to the more complex strandard optimal control model formulation and to the simpler transfer function/noise representation is discussed. Problems pertinent to structural identifiability and the form of the parameterization are elucidated. A systematic

approach towards the identification of the observer acquisition model parameters from ensemble tracking error data is presented. Author

N82-30837*# National Aerospace Lab., Amsterdam (Netherlands).
THE EFFECT OF VISUAL INFORMATION ON THE MANUAL APPROACH AND LANDING **c54**
P. H. Wewerinke *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 49-65 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

The effect of visual approach and landing information in combination with basic display information on the approach performance is examined. A pre-experimental model analysis was performed in terms of the optimal control model. Aircraft approach performance predictions were compared with the results of a moving base simulator program. Author

N82-30838*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
PILOT/VEHICLE MODEL ANALYSIS OF VISUAL AND MOTION CUE REQUIREMENTS IN FLIGHT SIMULATION **c09**
R. Lancraft, G. Zacharias, and S. Baron *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 66-91 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 14B

The optimal control model for pilot/vehicle analysis is used to investigate the closed-loop consequences of the performance limitations associated with a computer generated image (CGI) visual system and a six degree-of-freedom motion simulator (VMS) in a helicopter hover task. The specific problem addressed was to determine the potential effects of CGI and VMS system characteristics on closed-loop hover performance and pilot workload, and to evaluate these effects in light of performance/workload levels we might expect to see in the actual flight situation. Author

N82-30839*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PURSUIT TRACKING AND HIGHER LEVELS OF SKILL DEVELOPMENT IN THE HUMAN PILOT **c53**
Ronald A. Hess *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 92-105 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05I

A model of the human pilot is offered for pursuit tracking tasks; it encompasses an existing model for compensatory tracking. The central hypothesis in the development of this model states that those primary structural elements in the compensatory model responsible for the pilot's equalization capabilities remain intact in the pursuit model. The sharp reduction in low-frequency phase lag beyond that associated with the disappearance of phase droop is seen to accompany relatively low-gain feedback of vehicle output. The results of some recent motion cue research are discussed and interpreted in terms of the compensatory-pursuit display dichotomy. Preview is shown to demand no fundmanetal changes in structure or equalization, and to allow the pilot to eliminate the effective time delays that accrue in the inversion of the controlled-element dynamics. Precognitive behavior is discussed and a model that encompasses all the levels of skill development outlined in the successive organizations of perception (SOP) theory is finally proposed. Author

N82-30840*# Systems Technology, Inc., Mountain View, Calif.
TRAINING AIRCRAFT DESIGN CONSIDERATIONS BASED ON THE SUCCESSIVE ORGANIZATION OF PERCEPTION IN MANUAL CONTROL **c05**
Robert K. Heffley, Warren F. Clement, and Samuel J. Craig (Vought Corp., Hawthorne, Calif.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 119-127 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 01C

Pilot skill development in the approach and landing task is very strongly tied to the aircraft closure rate and, therefore, pilot training for this task should be based on an appropriate progression closure rate. This, in turn, leads to a rational and explicit determination of design point approach speeds as well as other important aerodynamic features for training aircraft. One key is to recognize the significance of transitioning from a purely compensatory control loop technique to one involving a pursuit crossfeed between throttle and pitch attitude. Such transitioning requires significant skill development, yet reduces pilot workload while enhancing flight path and airspeed performance. The second key is to address the terminal flight path adjustment in terms of range-to-go. This establishes a bridge between the visual field and the combination of manual control technique and vehicle flight dynamics. A design summary plot is thus created in terms of: (1) performance (flight path bandwidth); (2) critical range-to-go (for terminal path correction); and (3) closure rate. Author

N82-30841*# Tokyo Univ. (Japan). Dept. of Aeronautics.
AN EXPERIMENTAL STUDY OF HUMAN PILOT'S SCANNING BEHAVIOR **c54**
Kyuichiro Washizu, Keiji Tanaka (National Aerospace Lab., Tokyo), and Tatsuo Osawa *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 128-133 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

The scanning behavior and the control behavior of the pilot who manually controls the two-variable system, which is the most basic one of multi-variable system, which is the most basic one of multi-variable systems are investigated. Two control tasks, which simulate the actual airplane attitude and airspeed control are reported. In order to simulate the change of the situation where the pilot is placed, such as changes of flight phase, mission and others, the subject was requested to vary the wrightings, as his control strategy, upon each task. Changes of human control dynamics and his scanning properties caused by the modification of the situation were investigated. Author

N82-30842*# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany). Dept. of Human Factors Engineering and Simulation.
PARAMETRIC IDENTIFICATION OF HUMAN OPERATOR MODELS **c54**
Norbert R. Ninz *In* MIT Proc. of the 16th Ann. Cong. on Manual Control 1980 p 137-145 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

The accurate and efficient identification of the human operator is still a need in human factors engineering especially concerning multivariable control. Control theoretic identification methods need to be tested with human operator models under realistic boundary conditions. The requirements and criteria for the use of parametric methods, selected models as well as the Maximum Likelihood Method and the Extended Kalman Filter are displayed. The experiments and results are comparatively discussed from the point of practical engineering. Author

N82-30843*# Georgia Inst. of Tech., Atlanta. Systems Engineering Lab.
A COMPUTER SIMULATION APPROACH TO MEASUREMENT OF HUMAN CONTROL STRATEGY **c54**
Joanne Green, Esther Lee Davenport, Harold F. Engler, and William E. Sears, III *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 146-171 refs (For primary document see N82-30833 21-51)
(Contract N00014-75-C-0432)
Avail: NTIS HC A99/MF A01 CSCL 05H

Human control strategy was measured through use of a psychologically based computer simulation which reflects a broader theory of control behavior. The simulation is called the human operator performance emulator (HOPE). HOPE was designed to emulate control learning in a one-dimensional preview tracking task and to measure control strategy in that setting. HOPE generates control stick behavior corresponding to that which might be used by a person learning preview tracking. Author

N82-30844*# Massachusetts Inst. of Tech., Cambridge.
SUBJECTIVE SCALING OF MENTAL WORKLOAD IN A MULTI-TASK ENVIRONMENT **c53**
Bahman Daryanian *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 172-188 refs (For primary document

see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05I

The results of a mental workload experiment which was carried out in a simulated multi-task environment are reported. The experiment developed and examined a method that would qualitatively and quantitatively identify those factors in a multi-task environment that contribute to the operators' sense of mental workload. Thurstone's law of comparative judgment was employed to construct in interval scales of subjective mental workload from paired comparisons data. L.F.M.

N82-30845*# San Jose State Univ., Calif.
EFFECT OF COUNTING AND TRACKING ON VERBAL AND PRODUCTION METHODS OF TIME ESTIMATION c53
Kathleen L. Bird and Sandra Hart *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 199-211 refs Prepared in cooperation with Tufts Univ., Medford, Mass. (For primary document see N82-30833 21-51)
(Contract NCC2-34; Grant NsG-2156)
Avail: NTIS HC A99/MF A01 CSCL 05I

The effects of time estimation technique and task condition on the production and verbal estimation of time intervals ranging from 5 to 14 sec were investigated. Sixteen male college students were randomly assigned to two groups, each of which utilized a different estimation method: (a) production; or (b) verbal estimation. The subjects were instructed either to produce or to give a verbal estimate of the duration of these time intervals during each task condition: (a) pretracking, (b) tracking (subject performed a one-axis tracking task), and (c) posttracking. Each subject used each of the two estimation techniques: (a) vocal counting and (b) no counting. The ratio of the subject's time estimate to actual interval length was computed for each trial. Productions were typically longer than verbal estimates of the same duration and produced durations were typically too long whereas verbal estimates were too short relative to the correct duration. A significant interaction was found between counting technique and tracking condition for both estimation methods. A significant effect could be attributed to the addition of a tracking task. Author

N82-30846*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
A MODEL BASED TECHNIQUE FOR PREDICTING PILOT OPINION RATINGS FOR LARGE COMMERCIAL TRANSPORTS c53
William H. Levison *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 216-242 refs (For primary document see N82-30833 21-51)
(Contract NAS1-15529)
Avail: NTIS HC A99/MF A01 CSCL 05I

A model-based technique for predicting pilot opinion ratings is described. Features of this procedure, which is based on the optimal-control model for pilot/vehicle systems, include: (1) capability to treat 'unconventional' aircraft dynamics, (2) a relatively free-form pilot model, (3) a simple scalar metric for attentional workload, and (4) a straightforward manner of proceeding from descriptions of the flight task environment and requirements to a prediction of pilot opinion rating. The method was able to provide a good match to a set of pilot opinion ratings obtained in a manner simulation study of large commercial aircraft in landing approach. Author

N82-30847*# National Aerospace Lab., Tokyo (Japan). Instrumentation and Control Div.
AN ANALYTICAL PREDICTION OF PILOT RATINGS UTILIZING HUMAN PILOT MODEL c53
Keiji Tanaka and Kyuichiro Washizu *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 243-253 refs Prepared in cooperation with Tokyo Univ. (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05I

In order to analytically predict pilot ratings, an evaluation method of a manual control system which consists of an aircraft and a human pilot, is proposed and examined. The method is constructed upon the assumptions that the control mission determines the critical frequency the pilot should bring to his focus, and that the degree of closed-loop stability and the human compensation necessary to attain the stability determine the human subjective evaluation of the system. As a result, a simple evaluation chart is introduced. The chart enables us to predict the subjective evaluation, if the controlled element dynamics and the mission are given. The chart is in good accord with almost all of the existing results of pilot ratings. This method has the following four advantages: (1) Simplicity, in a sense that the method needs to evaluate only two typical controlled element parameters, namely, the gain slope and the phase at the critical control frequency; (2) Applicability to unstable controlled elements; (3) Predictability of controllability limits of manual control; (4) Possibility of estimating human compensatory dynamics. Author

N82-30848# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
EFFECTS OF HIGHER ORDER CONTROL SYSTEMS ON AIRCRAFT APPROACH AND LANDING LONGITUDINAL HANDLING QUALITIES c08
Muhammad A. Pasha (Pakistan Air Force), John J. DAzo, and James T. Silverthorn *In* MIT Proc. of the 16th Conf. on Manual Control 1980 p 254-264 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 01C

A study of approach and landing longitudinal flying qualities, based on data generated by Calspan using a variable stability NT-33 aircraft combined with significant control system dynamics is presented. An optimum pilot lead time for pitch tracking, flight path angle tracking, and combined pitch and flight path angle tracking tasks is determined from a closed-loop simulation using integral squared error (ISE) as a performance measure. Pilot gain and lead time were varied in the closed-loop simulation of the pilot and aircraft to obtain the best performance for different control system configurations. The results lead to the selection of an optimum lead time using ISE as a performance criterion. Using this value of optimum lead time, a correlation is then found between pilot rating and performance with changes in the control system and in the aircraft dynamics. It is also shown that pilot rating is closely related to pilot workload which, in turn, is related to the amount of lead which the pilot must generate to obtain satisfactory response. The results also indicate that the pilot may use pitch angle tracking for the approach task and then adds flight path angle tracking for the flare and touchdown. Author

N82-30849*# Princeton Univ., N. J. Flight Research Lab.
PILOT OPINIONS OF SAMPLING EFFECTS IN LATERAL DIRECTIONAL CONTROL c08
Robert F. Stengel and George E. Miller *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 265-270 refs (For primary document see N82-30833 21-51)
(Contract N00014-78-C-0257)
Avail: NTIS HC A99/MF A01 CSCL 01C

Flight experiments with a microprocessor control system were conducted to determine the effects of variations in sampling parameters on several pilots' opinions of lateral-directional flying qualities. Princeton's Variable Response Research Aircraft, which is equipped with a microprocessor-based digital flight control system was the test vehicle. Two U.S. Navy pilots evaluated the effects of sampling rate, quantization, and pure time delay during tracking, approach, and landing. Aircraft carrier approach tasks were conducted using a Navy approach mirror. Acquisition and tracking of fixed objects on the ground provided additional information related to the Navy mission. Author

N82-30850*# Arizona Univ., Tucson. Human Factors/Man Machine Systems Lab.
A MODEL OF SUBJECTIVE PROBABILITIES FROM SMALL GROUPS c65
William R. Ferrell and Kelly Rehm *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 271-284 refs (For primary document see N82-30833 21-51)
(Grant NSF ENG-78-09365)
Avail: NTIS HC A99/MF A01 CSCL 12A

A study of probability judgments by groups of 4 people is presented. The research used the decision variable partition model of subjective probability and a simple model of the effects of interaction on judgments to simulate the group judgment of discrete probabilities investigated by Seaver. The initial results

of the simulation are very promising in that: (1) they show the principal effects Seaver observed and (2) these effects can, for the most part, be traced to specific characteristics of the models. This work may thus provide a basis for further investigation of how best to aggregate individual forecasts. L.F.M.

N82-30851*# Massachusetts Inst. of Tech., Cambridge. Man Vehicle Lab.

COMBINED EFFECT OF THE OCULOGYRAL ILLUSION AND OF A FIXED PERIPHERAL FIELD ON SENSATIONS OF YAW MOTION **c09**

J. K. Huang and L. R. Young *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 286-291 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 14B

Results concerning detection and reaction to angular acceleration in the dark and with a fixed visual field show that, for low accelerations, the visual input enhances the sensitivity to self motion. Since the visual surround is fixed with respect to the subject, and might imply a no motion or null signal if interpreted as a circularvection input, it conflicts with the true rotation sensed by the semicircular canals and might be expected to inhibit the motion sensation. Furthermore, vestibular nucleus unit activity was shown to be inhibited by a fixed visual surround in similar circumstances and compensatory eye movements are suppressed by visual fixation. The enhancement at low acceleration is attributed to the sensitive motion detection associated with the oculogyral illusion of relative motion of a fixed spot during subject rotation. L.F.M.

N82-30852*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

A PERFORMANCE ANALYSIS STUDY OF A COMPLEX G FIELD EXPERIMENT **c52**

D. W. Repperger *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 292-315 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 06S

A performance study was conducted on human tracking under a complex field. Three important points are illustrated. First it shows the connection between the phase plane boundary points and window measures through the use of cumulative distribution function (CDF) on the data. Secondly, the effects of stress on tracking performance manifests itself via the t tests across CDF's under two experimental conditions. It is shown for one subject and 4 replications that there exists a significant performance degradation due to stress. A third point made by this paper is that a K-S test on the distributions of the phase plane trajectories indicate the nonnormality of the empirical density functions. This statement can be made with greater than 99% confidence. It is interesting in this case to have such a result hold for a tracking task which is sum of sines and to contrast this result to the deteministic case considered. L.F.M.

N82-30853*# Systems Technology, Inc., Hawthorne, Calif.

A SOFTWARE PACKAGE FOR EVALUATING THE TRANSMISSIBILITY BETWEEN VEHICLE VIBRATION AND MOTIONS OF HANDS (IN CONTROLS), LIMB, HEAD AND EYES **c54**

Susan A. Riedel, Henry R. Jex, and Raymond E. Magdaleno *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 317-339 refs (For primary document see N82-30833 21-51)

(Contract F33615-79-C-0519)

Avail: NTIS HC A99/MF A01 CSCL 05H

A user oriented computer program for exercising the 1980 version of the STI biodynamic model BIODYN-80 was completed. The user inputs some 80-100 variables describing the assumed posture, interface characteristics (e.g., stick feel), and vestibular characteristics. The computer calculates the transfer functions between vibration input and various selected outputs of interest to the user. Another option is to output the operator's torso-limb-neuromuscular loop transmissibilites as seen at the stick, as required for the AMRL/BBN PIVIB computer program for computing tracking performance effects of vibration. Applications to some current problems are demonstrated. Author

N82-30854*# Connecticut Univ., Storrs. Dept. of Electrical Engineering and Computer Science.

MODELING LATERAL ACCELERATION EFFECTS ON PILOT PERFORMANCE **c52**

Jonathan Korn and David L. Kleinmen *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 340-348 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 06S

Attendant to the direct side force maneuver of a vectored force fighter is the transverse acceleration imposed on the pilot. This lateral acceleration (G sub y), when combined with a positive G sub z stress, is a potential source of pilot tracking performance impairment. Experimental and analytical modeling of pilot performance decrements using the optimal control model (OCM) is described. J.D.

N82-30855*# Systems Technology, Inc., Hawthorne, Calif.

A COMPREHENSIVE SYSTEM MODEL FOR MOTION/SPACE SICKNESS: PRELIMINARY RESULTS **c52**

Susan A. Riedel *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 349-368 refs (For primary document see N82-30833 21-51)

(Contract NAS2-10430)

Avail: NTIS HC A99/MF A01 CSCL 06P

The observed facts of motion/space sickness are categorized and ordered into a rational structure for use in a comprehensive system model for motion/space sickness. An array of key facts, consisting of a collection of motion/space sickness observations assembled from the current literature which must be accounted for in the comprehensive model, is presented. A model structure responsive to the array of key facts and to the other requirements of a working research tool is presented. J.D.

N82-30856*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

EVALUATION OF A TRAJECTORY COMMAND CONCEPT FOR MANUAL CONTROL OF CARRIER APPROACHES AND LANDINGS **c08**

Walter E. McNeill, G. Allan Smith, Jr., and Ronald M. Gerdes *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 370-392 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 01C

A trajectory control system concept for providing manual control of a conventional jet aircraft is described. The total aircraft flight control system (TAFCOS) utilizes an inverse model of the aerodynamic and propulsion characteristics and employs feedforward control to provide the required acceleration command. On-board digital computations which can easily be handled by a modern airborne computer are required. The system was studied in a piloted simulation of the carrier approach and landing task with primarily visual flight and guidance cues. The principal modes of vertical flight path control investigated were vertical velocity command and vertical acceleration command. The study included manual carrier approaches with and without moderate ship motion and associated air disturbances, and tests of the effects of discrete gusts. Manual control of flight path through this concept was shown to be feasible as an addition to an automatic control system and to have potential as an improved mode of control over conventional control for the carrier approach task. The concept also offers several advantages, among which are design flexibility, automatic compensation for external disturbances, and prevention of abusive pilot control. Author

N82-30857*# Systems Technology, Inc., Mountain View, Calif.

APPLICATION OF A PILOT CONTROL STRATEGY IDENTIFICATION TECHNIQUE TO A JOINT FAA/NASA GROUND BASED SIMULATION OF HEAD UP DISPLAYS FOR CTOL AIRCRAFT **c06**

Wayne F. Jewell *In* MIT Proc. of the 16th Ann Conf. on Manual Control 1980 p 395-409 refs (For primary document see N82-30833 21-51)

(Contracts NAS2-10385; DOT-FA77WAI-725; NASA-NMI-1052.151)

Avail: NTIS HC A99/MF A01 CSCL 01D

The development, evaluation, and application of a technique for measuring a pilot's control strategy is described. The nonintrusive pilot identification program (NIPIP) estimates the pilot's input-output describing function and combined pilot vehicle performance parameters such as crossover frequency and phase margin by using a time domain model of the pilot and a least

squares identification algorithm. It functions in realtime and uses a 'sliding' time window to maintain freshness in the data; thus time varying characteristics in the pilot's control strategy can be measured. The application of NIPIP to a realtime ground based simulation of two competing concepts of head up displays (HUD) for use in conventional takeoff and landing aircraft. Differences in the pilot's control strategy used for the two HUDs and the head down display are quantified in terms of differences in the pilots' describing functions and combined pilot vehicle measurements. Conclusions based on the performance evaluation and application of NIPIP are presented and some recommendations on how NIPIP could be used in other manual control tasks are discussed. J.D.

N82-30858*# Dayton Univ., Ohio. Dept. of Aerospace Engineering.

PILOT REACTION TO ATTITUDE GYRO FAILURE: A FLIGHT EXPERIMENT c54

Richard L. Newman and David L. Quam *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 410-421 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 05H

A flight experiment using a Cessna 172 airplane with the vacuum system modified to permit total failure of the attitude and directional gyros is described. Nine subject pilots, ranging in experience from 170 to 5100 hours, flew simulated (hooded) instrument missions with an unexpected gyro failure introduced at a critical point. All subjects, except for the 170 hour pilot, were instrument rated. (The 170 hour pilot was a private pilot working on his instrument rating). All of the subject pilots were able to maintain control of the airplane following the gyro failure. Only one subject exceeded the a priori criterion of losing a maximum of 250 feet of altitude. None of the subjects flew a satisfactory VOR approach following the failure; however, all would have found the airport safely given a ceiling of 1000 feet or better. J.D.

N82-30859*# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.

DESIGN, SIMULATION AND EVALUATION OF ADVANCED DISPLAY CONCEPTS FOR THE F-16 CONTROL CONFIGURED VEHICLE c06

Robert W. Klein (Grumman Aerospace Corp., Bethpage, N.Y.) and Walter M. Hollister *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 424-438 refs (For primary document see N82-30833 21-51)

(Grant AF-AFOSR-3260-78)

Avail: NTIS HC A99/MF A01 CSCL 01D

The F-16 control configured vehicle (CCV) flight test program, and current aircraft display research are reviewed and task oriented and compensatory displays to further enhance the capability of the F-16 CCV are suggested. The fixed base M.I.T. 707 simulator was modified to represent the F-16 CCV. An isometric sidearm control stick and two axis CCV thumb button were installed in the cockpit. The forward cockpit CRT was programmed to present an external scene (numbered runway, horizon) and the designed heads up display. The cockpit interior was modified to represent a fighter and the F-16 CCV dynamics and direct lift and side force modes were programmed. Compensatory displays were designed from man/machine considerations. Pilots evaluated the heads up display and compensatory displays during simulated descents in the presence of several levels of filtered, zero mean wind gusts. During a descent from 2500 feet to the runway, the pilots tracked a point on the runway utilizing the basic F-16, F-16 CCV, and F-16 CCV with advanced displays. Substantial tracking improvements resulted utilizing the CCV modes, and the displays were found to even further enhance the tracking ability of the F-16 CCV. J.D.

N82-30860*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SEPARATION MONITORING WITH FOUR TYPES OF PREDICTORS ON A COCKPIT DISPLAY OF TRAFFIC INFORMATION c06

Sharon Jago and Everett Palmer *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 439-447 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 01D

The concept of a cockpit display of traffic information (CDTI) includes the integration of air traffic, navigation, terrain and weather information in a single electronic display in the cockpit. Investigations designed to develop a clear and concise display format for use in later full mission simulator evaluation of the CDTI concept are described. The experiment required airline pilots to monitor a CDTI and make perceptual judgments concerning the future position of a single intruder aircraft in relationship to their own aircraft (ownship). The main experimental variable was the type of predictor used to display future position of each aircraft. Predictors were referenced to the ground or to ownship and they either included turn rate information or did not. Other variables were the aircraft's separation distance when the judgment was required and the type of encounter (straight or turning). Results indicate that under these experimental conditions fewer errors were made when the predictor included turn rate information. There was little difference in overall error rate for the curved ground referenced and the ownship referenced predictors. Author

N82-30861*# Ohio State Univ., Columbus. Dept. of Industrial and Systems Engineering.

COMBINED DISCRETE NETWORK CONTINUOUS CONTROL MODELLING OF OPERATOR BEHAVIOR c53

R. A. Miller and Deborah J. Seifert (AiResearch Manufacturing Co.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 448-464 refs (For primary document see N82-30833 21-51)

Avail: NTIS HC A99/MF A01 CSCL 05I

Systems in which an operator is faced with a continuous control task plus one or more discrete information processing tasks were investigated. A modeling approach which has the capability of realistically representing both types of tasks and the resulting interactions is described. The modeling approach utilizes discrete network models for the cognitive tasks and elements of an open loop/closed loop control representation for the continuous task. The approach is demonstrated through its application to a simulated digital avionics information system in which subjects were required to perform retrieval and processing tasks as well as flight control. This model differs from conventional models in that system status sampling is not necessarily continuous or periodic. Rather, the pilot is assumed to read system status displays only as time permits and operate in open loop preprogrammed fashion between sampling. J.D.

N82-30862*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.

A MODEL OF HUMAN DECISION MAKING IN MULTIPLE PROCESS MONITORING SITUATIONS c53

Joel S. Greenstein and William B. Rouse (Illinois Univ., Urbana-Champaign) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 465-487 refs (For primary document see N82-30833 21-51)

(Grant NsG-2119)

Avail: NTIS HC A99/MF A01 CSCL 05J

Human decision making in multiple process monitoring situations is considered. It is proposed that human decision making in many multiple process monitoring situations can be modeled in terms of the human's detection of process related events and his allocation of attention among processes once he feels events have occurred. A mathematical model of human event detection and attention allocation performance in multiple process monitoring situations is developed. An assumption made in developing the model is that, in attempting to detect events, the human generates estimates of the probabilities that events have occurred. An elementary pattern recognition technique, discriminant analysis, is used to model the human's generation of these probability estimates. The performance of the model is compared to that of four subjects in a multiple process monitoring situation requiring allocation of attention among processes. Author

N82-30863*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

PROCRU: A MODEL FOR ANALYZING FLIGHT CREW PROCEDURES IN APPROACH TO LANDING c54

S. Baron, G. Zacharias, R. Muralidharan, and R. Lancraft *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980

p 488-520 refs (For primary document see N82-30833 21-51) (Contract NAS2-10035)
Avail: NTIS HC A99/MF A01 CSCL 05H

The Procedure Oriented Crew Model (PROCRU) simulation model for examining crew procedures in approach to landing is described and the results of its operation illustrated. It models cognitive and perceptual motor activities including monitoring and information processing, flight control, decision making, execution of standard procedures, and communiations with other crew members and with air traffic control. a system model and a model for each crew member are included. The crew is composed of three members: pilot flying (PF), pilot not flying (PNF), and second officer (SO). The SO is modeled as a purely deterministic program that responds to events and generates requests. The PF and PNF are each represented by complex human operator models having information processing and decision making components. J.D.

N82-30864*# Systems Research Labs., Inc., Dayton, Ohio.
APPLICATION OF OPTIMAL CONTROL PRINCIPLES TO DESCRIBE THE SUPERVISORY CONTROL BEHAVIOR OF AAA CREW MEMBERS c53
Chris Hale and George J. Valentino (Air Force Aerospace Medical Reseach Lab., Wright-Patterson AFB, Ohio) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 523-532 (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05J

Supervisory decision making and contol behavior within a C to the third power oriented, ground based weapon system was studied. The sequence of control strategies used during engagement of aircraft targets was empircally investigated. An engagement is conceptually divided into several stages which include initial information processing activity, tracking, and ongoing adaptive control decisions. Model parameters are described and two experiments which served as initial investigation into the accuracy of assumptions on the importance of situation assessment in procedure selection are outlined. The validity of the assumptions on strategic information processing and cue criterion relationship learning is upheld. It is indicated that the model structure is useful in studies of supervisory decision behavior. E.A.K.

N82-30865*# Arnott (Douglas R.), Huntington Station, N.Y.
DOES MAN ALWAYS CLOSE THE LOOP IN TRYING TO PILOT A LARGE SHIP c08
Douglass R. Arnott and T. Govindaraj (Purdue Univ., Lafayette, Ind.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 533-539 C A99/MF A01 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01

Control of a slowly responding complex dynamic system such as a supertanker poses special human problems was examined. A model for better control actions must be based on information over a longer time span and the model should have appropriate features to handle such situations. The maneuvers consist of piloting a large ship along a narrow waterway. It is suggested that the human operates as a feedforward controller utilizing the preview information for gross changes in heading, and as a feedback controller for correcting small deviations. The instruments displayed on the deck are helpful in all situations. It is indicated that some of the displays might even interfere with the pilot's attempt to form a good internal model. E.A.K.

N82-30866*# Technische Hogeschool, Delft (Netherlands).
SUPERVISION OF DYNAMIC SYSTEMS: MONITORING, DECISION-MAKING AND CONTROL c81
Ted N. White *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 540-547 refs Sponsored by the Netherlands Organization for the Advancement of Pure Research (ZWO) (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05A

Effects of task variables on the performance of the human supervisor by modelling techniques are discussed. The task variables considered are: the dynamics of the system, the task to be performed, the environmental disturbances and the observation noise. A relationship between task variables and parameters of a supervisory model is assumed which consists of three parts: (1) the observer part is a full order optimal observer; (2) the decision making part is a set of decision rules; and (3) the controller part is given by a control law. The identification of the model parameters, by a random search method, and a more psychologically oriented method primarily based on statistics are used. The psychological approach deals with a direct comparison of the number of control actions, the amplitudes of those control actions, and the number of observation actions generated by the operator as a function of the task variables. E.A.K.

N82-30867*# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
THE ROLE OF ANTAGONIST COACTIVATION IN THE CONTROL OF NATURAL MOVEMENT c52
Neville Hogan *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 571-583 refs (For primary document see N82-30833 21-51)
(Grant NSF PFR-79-17348)
Avail: NTIS HC A99/MF A01 CSCL 06P

The control of the impedance about the joints of the natural musculoskeletal system by coactivation of antagonist muscle groups is described. The consequences of the ability to control joint impedance are discussed. An explanation of the crucial role played by two joint muscles in the control of natural movement is proposed. The implications for the control manipulators and the modeling of the human operator are discussed. E.A.K.

N82-30868*# Massachusetts Inst. of Tech., Cambridge.
A COMPARISON OF CONTROL MODES FOR TIME-DELAYED REMOTE MANIPULATION c54
Gregory P. Starr *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 584-592 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

Transmission time delay in the communication channel of a manual control system which degrades performance by preventing the human operator from immediately seeing the results of his actions is discussed. A time delay exists in remote manipulation systems, caused by long communication distances or bandwidth limitations. It is suggested tha because of the difficulty of effectively using the move and wait strategy with a master slave manipulator rate control is a more effective control mode with time delay. Manipulator rate controllers are usually multiaxis joysticks or switchboxes and are constructed so that the manipulator can be held stationary. The hand is removed from the controller which eliminates the possibility of undesired manipulator motion and should aid in the use of the move and wait strategy. Master slave and rate control of a manipulator are compared. Four time delays are used. These delays allow the examination of the effect of time delay on control mode performance. A peg transfer task used, with automated dated acquisition. E.A.K.

N82-30869*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Robotics and Teleoperator Group.
EXPERIMENTAL EVALUATION OF THE CONCEPT OF SUPERVISORY MANIPULATION c54
T. L. Brooks and T. B. Sheridan (MIT) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 593-606 refs (For primary document see N82-30833 21-51)
(Contracts NAS7-100; N00014-77-C-0256)
Avail: NTIS HC A99/MF A01 CSCL 05H

A computer controlled teleoperator system which is based on task referenced sensor aided control to study supervisory manipulation was developed. This SUPERMAN system, performs complicated tasks in real time by utilizing the operator for high level functions related to the unpredictable, portions of a task, while the subordinate machine performs the more well defined subtasks under human supervision. Supervisoy control schemes were compared with manual control under real time conditions. Six representative tasks were performed under simulated conditions using four forms of manual control, as well as suprvisory control. The effectiveness and quality of control were evaluated on the basis of the time required to complete each portion of the task and the type and number of errors which occurred. It is found that supervisory control improves performance for all forms of manual control except force reflecting master-slave which

is slightly faster than supervisory control, but more prone to errors. E.A.K.

N82-30870*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

EVALUATION OF SMART SENSOR DISPLAYS FOR MULTIDIMENSIONAL PRECISION CONTROL OF SPACE SHUTTLE REMOTE MANIPULATOR c54

A. K. Bejczy, J. W. Brown (JPL, Calif. Inst. of Tech., Pasadena), and J. L. Lewis *In* MIT Proc. of 16th Ann. Conf. on Manual Control 1980 p 607-627 refs (For primary document see N82-30833 21-51)

(Contract NAS7-100)

Avail: NTIS HC A99/MF A01 CSCL 05H

An enhanced proximity sensor and display system was developed and tested on the full scale Space Shuttle remote manipulator. The sensor system, integrated with a four claw end effector, measures range error up to 6 inches, and pitch and yaw alignment errors within + or - 15 deg., and displays error data on both graphic and numeric displays. The errors are referenced to the end effector control axes through appropriate data processing by a microcomputer acting on the sensor data in real time. Methods to minimize terminal range and alignment errors by utilizing range, pitch and yaw error information from the sensor displays were investigated. The test runs aided by sensor displays are contrasted with test runs without sensor display aids. The enhanced sensor and display system, the test runs and results are described. It is indicated that the use of graphic/numeric displays of proximity sensor information improves precision control of grasp/capture range by more than a factor of two for both static and dynamic grapple conditions. E.A.K.

N82-30871*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF RESTRICTED MOBILITY ON THE COMPOSITION AND METABOLISM OF BLOOD LIPOPROTEIDS IN RABBITS

P. P. Chayalo and T. A. Kirlyenko Apr. 1982 13 p refs Transl. into ENGLISH from Ukr. Biokhim. Zh. (USSR), v. 52, no. 3, 1980 p 359-364 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76846; NAS 1.15:76846) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The content of total cholesterol and triacylglycerols in the blood increases in rabbits, subjected to conditions of restricted mobility for a period of two months, because of the increase in the content in the composition of lipoproteids of very low and low density. After intravenous administration of lipoproteids of very low density, which contain H3 cholesterol, the slowing of their dissociation was observed with hypokinesia. The metabolism of lipoproteids of low and high density is also slowed under these conditions while the activity of lipoproteidlipase in the blood plasma decreases. S.L.

N82-30872*# National Aeronautics and Space Administration, Washington, D. C.

REGIONAL REDISTRIBUTIONS OF THE BLOOD IN BLOOD LOSS AND MECHANICAL TRAUMA AGAINST THE BACKGROUND OF VARIOUS FUNCTIONAL STATES OF THE BODY

O. A. Kovalev, V. K. Kulagin, and B. I. Krivoruchko Jun. 1982 15 p refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 4, 1979 p 27-34 Transl. by SCITRAN, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76880; NAS 1.15:76880) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Loss of 20-40% of circulating blood volume in immobilized rats subjected to shock by Kennon's method with either short term fixation of controls or 7 day hypokinesia was investigated. Phases of shock caused by compression of soft tissues and of irreversible shock caused by Kennon's method are described. Regional and after 7 day hypokinesia were studied. Shifts in the relative content of blood in organs and tissues and their relation to pathophysiology resulting from blood loss or mechanical trauma are discussed. Regional redistributions of blood may be caused by various factors such as stress, excitation and hemostasis. Characteristic sequential stages of regional blood redistribution are noted during the progression of the physiological reaction to extreme external effects. E.A.K.

N82-30873*# National Aeronautics and Space Administration, Washington, D. C.

THE INTERACTION OF PURKINJE CELLS, CAPILLARIES AND GLIA IN THE CEREBELLAR CORTEX OF NORMAL AND HYPOKINETIC CATS

R. P. Kotskovich Jun. 1982 13 p refs Transl. into ENGLISH from Biol. Nauk. (USSR), no. 3, 1981 p 50-54 Transl. by SCITRAN, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76882; NAS 1.15:76882) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The interaction of Purkinje cells, capillaries and glicocytes in the cerebral cortex of normal and hypokinetic cats was studied. It is demonstrated that prolonged hypokinesia does not cause significant changes in the structure of Purkinje cells. It is found that morphological changes in the capillaries take place, which leads to a reduction in the vascular microbasin in the nerve cells. E.A.K.

N82-30874*# National Aeronautics and Space Administration, Washington, D. C.

INFLUENCE OF HYPOKINESIA ON THE CONTENT OF ELECTROLYTES IN ANIMAL ORGANS

G. D. Reushkina, V. N. Reushkina, and N. P. Roslyakov May 1982 4 p Transl. into ENGLISH from Patol. Fiziol. eksp. Ter. (USSR), no. 2, Mar. - Apr. 1981 p 92 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76899; NAS 1.15:76899) Avail: Issuing Activity CSCL 06C

In 60 day controlled tests of hypokinesia of 35 rabbits, significant reduction in potassium, sodium and chlorine concentration in the myocardium and hypothalamus and slight reductions in the adrenals were noted. Intravenous administration of strophanthin had no effect. After 60 days of kypokinesia, no further change in electrolyte concentration in the hypothalamus was noted. Further reduction in sodium, but an increase in potassium in the adrenals, and a progressive reduction of potassium content in the myocardium were noted. Administration of strophanthin caused no significant changes in electrolyte concentrations of the hypothalamus or adrenals, but it increased the sodium, chlorine and particularly potassium concentration of the myocardium. R.J.F.

N82-30875*# National Aeronautics and Space Administration, Washington, D. C.

BIOGENIC MONOAMIME CONTENT OF THE GANGLIA IN THE AUTONOMIC NERVOUS SYSTEM OF RABBITS DURING ACUTE EXPERIMENTAL EMOTIONAL STRESS

V. V. Portugalov, N. V. Petrova, S. I. Kashtanov, and B. N. Manukhin May 1982 13 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 5, Sep.-Oct. 1981 p 28-32 Original language document announced as A82-16817 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76900; NAS 1.15:76900) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

During emotional stress the content of norepinephrine in the adrenals, stellate ganglion and sympathetic chain increases, it decreases, in the myocardium and in the superior cervical ganglion it could not be determined. It was found that the content of epinephrine decreases in all the structures. Catecholamine depletion in the superior cervical ganglion has the most damaging effect of emotional stress. Introduction of electrodes into the hypothalamic ventromedial nuclei of intact rabbits induces shifts in the content of biogenic amines (in all structures with the exception of the myocardium). These shifts are similar in character but less pronounced than those in emotional stress. E.A.K.

N82-30876*# National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF IMMOBILIZATION ON THE DEVELOPMENT OF EXPERIMENTAL ARTERIOSCLEROSIS IN RABBITS
G. P. Deryagina and T. A. Sinitsyna May 1982 10 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 5, Sep. - Oct. 1981 p 32-36 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76901; NAS 1.15:76901) Avail: Issuing Activity CSCL 06C

The permeability of the aortic wall increased as a result of immobilization within one month in animals given their usual food. Morphological examination revealed lipoidosis of the intima of the aorta and cardiac coronary arteries in 50 percent of cases. Priminary immobiization of animals for one month with their subsequent maintenance on an atherogenic diet for five months increased the frequency of sharp and marked atherosclerotic changes in the aorta and coronaries as compared to that in animals kept only on an atherogenic diet for the same period. The changes in lipid metabolism and the blood coagulation system as a result of immobilization were less significant. Author

N82-30877*# National Aeronautics and Space Administration, Washington, D. C.
INFLUENCE OF STRESS ON THE BLOOD SYSTEM REACTION IN ADRENALECTOMIZED MICE
P. D. Gorizontov, M. I. Fedotova, and L. N. Yegorova May 1982 8 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 5, Sep. - Oct. 1981 p 36-39 Original language was announced as A82-16814 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76902; NAS 1.15:76902) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The role of adrenocortical hormones in the cardiovascular system reaction to stress was studied on adrenalectomized and sham operated F1 mice. it is noted that under stress in hypocorticism the number of lymphoid cells in peripheral blood does not increase and the number of cells in the thymus did not decrease. No increase in the number of hemopoietic stem cells in the bone marrow was noted. The cells diminished in the early phase of stress in both sham operated mice and adrenalectomized mice. It is found that in the spleen neutrophilic leucocytosis is not dependant on the level of adrenal hormones. E.A.K.

N82-30878*# National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF PROLONGED HYPOKINESIA ON RESISTANCE OF RESISTIVE VESSELS IN RATS
V. A. Saltykova Apr. 1982 8 p refs Transl. into ENGLISH from Kardiologiya (USSR), v. 20, no. 6, 1980 p 107-108 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Inst. of General Pathology and Pathological Physiology, Academy of Medical Sciences (USSR), Moscow
(Contract NASw-3542)
(NASA-TM-76849; NAS 1.15:76849) Avail: NTIS HC A02/MF A01 CSCL 06C

Under the effect of prolonged hypokinesia, the perfusion pressure in resistive vessels, measured under conditions of deep anesthesia and complete denervation, increased by approximately the same degree as arterial pressure in nonanesthetized animals. The increase in arterial, perfusion pressure and the resistance of resistive vessels in animals subjected to prolonged hypokinesia was accompanied by an increase in adrenoreactivity. During prolonged hypokinesia, partial obliteration of the vascular bed of the skeletal muscles plays a significant role in the observed increase in resistance of vessels of the extremities. The increase in adrenoreactivity of the vessels during hypokinesia may be realized as a partial case of an increase in the adrenoreactivity of structures whose innervation is disturbed. Author

N82-30879*# National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF MEBICAR ON ANIMALS UNDER EXTREME CONDITIONS
I. Ye. Zimakova, R. A. Kamburg, and S. V. Kirshin May 1982 8 p refs Transl. into ENGLISH from Farmakol. Toksikol. (USSR), v. 43, no. 4, Jul. - Aug. 1980 p 368-371 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76851; NAS 1.15:76851) Avail: Issuing Activity CSCL 06C

Mebicar, a new original tansquilizer, exerts a protective action on some parameters of body function under the influence of extreme conditions (stress hypoxia). The antihypoxic effect of the drug manifests itself w..in a wide range (100-1000 mg/kg), and compares favorably with the effect of sodium hydroxybutyrate. Mebicar does not affect the muscle tone, movement coordination, or working capacity of the animals. It is suggested that the normalizing action of mebicar as a tranquilizer and antihypoxic agent may be related to its involvement in metabolism. Author

N82-30880*# National Aeronautics and Space Administration, Washington, D. C.
REACTION OF THE BLOOD SYSTEM TO SINGLE AND DOUBLE EFFECT OF A STRESS AGENT
M. I. Fedotova and O. I. Belousova May 1982 8 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 6, Nov. - Dec. 1981 p 24-27 Original language document announced as A82-16814 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76866; NAS 1.15:76866) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Transformation of reaction to immobilization repeated 6 and 14 days after the first immobilization was demonstrated. Neutrophilic leukocytosis and limphopenia are maintained in the blood but are less marked. It is concluded that a long term phase of increased body resistance develops after 6 hours of immobilization. E.A.K.

N82-30881*# National Aeronautics and Space Administration, Washington, D. C.
ACTIVATION OF THE CEREBRAL GBA-ERGIC INHIBITING SYSTEM IN STRESS
V. I. Pavlova, V. V. Malyshev, and F. Z. Meerson May 1982 11 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 1, Jan. - Feb. 1981 p 26-30 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76867; NAS 1.15:76867) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Activation of the adrenergic and pituitary adrenal system which under the effects of prolonged severe stress factors such as immobilization or pain, was investigated. It is shown that activation of the hypophysealadrenal system in emotional pain stress in rats lasts 4 days after cessation of the stress effect and is attended regularly by activation of the GABA ergic inhibiting system. It is suggested that the GABA ergic inhibiting system is a nonspecific mechanism which is activated regularly when stress factors restricting the stress reaction act on the organism. E.A.K.

N82-30882*# National Aeronautics and Space Administration, Washington, D. C.
SPECIFICITY OF ULTRASTRUCTURAL CHANGES IN RAT CARDIOMYOCYTES AFTER LOCAL GAMMA-IRRADIATION AND HYPOKINESIA
V. S. Romanov and L. A. Bespalova May 1982 11 p refs Transl. into ENGLISH from Radiobiologiya (USSR), v. 21, no. 2, Mar.-Apr. 1981 p 238-242 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76853; NAS 1.15:76853) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Analysis was made of the results of the electronmicroscopic and morphometric studies of cardiomyocytes of 30 rats exposed to 516 mC/kg γ-radiation, and myocardium of 30 animals subjected to hypokinesia for 50 days. The morphome-

tric method revealed the distinctions on ultrastructural rearrangements in nuclei and mitochondria of myocardium cells with each effect applied. Author

N82-30883*# National Aeronautics and Space Administration, Washington, D. C.

INDICES OF THE RAT CENTRAL NERVOUS SYSTEM METABOLISM DURING 36- AND 60-DAY HYPOKINESIA

L. M. Kurkina, A. N. Panov, D. A. Rashevskaya, N. L. Tubinskaya, and R. A. Tigranyan May 1982 9 p refs Transl. into ENGLISH from Fiz. Zh. SSSR im. I. M. Sechenova, (USSR), v. 66, no. 4, Apr. 1980 p 475-479 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by USSR Academy of Sciences, Leningrad

(Contract NASw-3541)

(NASA-TM-76870; NAS 1.15:76870) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Male Wistar rats were kept hypokinetic for 46, 53, or 60 days to reveal biochemical alterations in the CNS. Neuronal and glial cytoplasmic RNA concentrations, acetylcholinesterase and butyrylcholinesterase activities, total thiol group content, and free amino acids were determined in various CNS tissues. A marked suppression of RNA metabolism appeared in the spinal cord, but RNA concentrations in the brain either did not change or increased slightly. There was a slight decrease of thiol group content in the brain. Amino acid determinations were inconclusive, but tended to show decreased amounts. The findings demonstrate that hypokinesia produces certain biochemical alterations, primarily suppression of activity, in certain regions of the CNS. Author

N82-30884*# National Aeronautics and Space Administration, Washington, D. C.

ROLE OF THE THYROID GLAND DURING ADAPTATION OF SKELETAL MUSCLES TO INCREASED MOTOR ACTIVITY

T. P. Seene, K. P. Alec, K. E. Tomson, and A. A. Viru May 1982 13 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 67, no. 2, Feb. 1981 p 299-305 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76871; NAS 1.15:76871) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Male Wistar rats were adrenalectomized or given MTU to produce thyroid deficits, then tested for physical performance during running and swimming. Quadriceps femoris muscle cells were tested for RNA and DNA content following sacrifice. It is found that thyroid hormone deficits reduce performance. Regular physical activity in intact animals leads to increased muscle mass and RNA content, while DNA and RNA content in muscle tissue is diminished in hypothyroid and adrenalectomized animals.

E.A.K.

N82-30885*# National Aeronautics and Space Administration, Washington, D. C.

CATECHOLAMINES IN THE BLOOD PLASMA OF AUGUST AND WISTAR RATS DURING EMOTIONAL STRESS

R. Kvetnanskiy, T. I. Belova, Z. Oprshalova, I. Ponets, A. Lindra, and V. A. Dushkin May 1982 15 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 67, no. 4, Apr. 1981 p 516-523 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76872; NAS 1.15:76872) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Male August and Wistar rats were catheterized and immobilized to produce stress. Blood pressure and catecholamine concentrations were measured during and after immobilization to reveal differences in the two groups' responses. Arterial pressure varied in both strains, but soon returned to initial levels in the Wistar rats, showing these animals to have greater cardiovascular stability. Stable arterial pressure is associated with low initial plasma catecholamine levels and higher levels during stress and that adrenal medullary activity differs in the two strains. S.L.

N82-30886*# National Aeronautics and Space Administration, Washington, D. C.

CHANGES OF BLOOD PLASMA RENIN ACTIVITY IN AUGUST AND WISTAR RATS UNDER EMOTIONAL STRESS

R. Kvetnanskiy, T. I. Belova, A. Lindra, Z. Oprshalova, and V. A. Dushkin May 1982 8 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 67, no. 6, Jun. 1981 p 911-915 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76873; NAS 1.15:76873) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Adult male August and Wistar rats were catheterized, then immobilized for two hours in order to make a comparative study of the neurochemistry of the physiological function stabilization during emotional stress. Arterial pressure was measured and blood samples were taken to ascertain plasma renin and catecholamine levels. Plasma renin activity was somewhat higher in August than in Wistar rats, but the August rats had a greater variability in results. The highest renin activity was found in those animals with highest blood pressure and adrenalin levels. In most cases there was no link between renin activity changes and catecholamine levels. S.L.

N82-30887*# National Aeronautics and Space Administration, Washington, D. C.

GLUCOCORTICOID RECEPTORS AND METABOLIC DISTURBANCES IN THE (RAT) LIVER AND HEART DURING IMMOBILIZATION

A. I. Bobkov and V. P. Kislyakova May 1982 13 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 67, no. 8, 1981 p 1258-1264 Original language document announced as A82-10750 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76874; NAS 1.15:76874) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Male rats were immobilized for 30 min to 2 days to define the compensated and decompensated phases of stress. Intracellular steroid receptor interactions in the liver and heart, glucocorticoid dependent enzyme synthesis, and some aspects of cell metabolism were studied. The compensated phase was characterized by reduction of glucocorticoid binding by cytoplasmic receptors in response to highendogeneous glucocorticoid levels, increased liver tissue tyrosine aminotransferase (TAT) activity, and high blood glucose and cholesterol levels. Prolonged stress led to the decompensated phase, characterized by lower blood and tissue endogeneous glucocorticoid levels, depleted cell glucose and cholesterol reserves, reduced protein content, increased blood and tissue urea, marked hyponatremia, and reduced liver cell TAT activity. S.L.

N82-30888*# National Aeronautics and Space Administration, Washington, D. C.

DNA AND RNA SYNTHESIS IN ISOLATED NUCLEI OF RAT SKELETAL MUSCLES DURING HYPODYNAMIA

I. V. Fedorov, G. S. Komolova, and A. V. Chernyy May 1982 9 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 67, no. 10, Oct. 1981 p 1521-1524 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76875; NAS 1.15:76875) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Male Wistar rats were immobilized for 22 days to determine the effects on RNA synthesis rates in skeletal muscle cell nuclei. Nerve impulses from working muscles facilitate activation of transcription, either by stimulating RNA and DNA polymerase activities or by maintaining DNA template integrity. It was found that the RNA transcription was diminished 41.7% and DNA synthesis 37% in these animals. E.A.K.

N82-30889*# National Aeronautics and Space Administration, Washington, D. C.

EMOTIONAL STRESS AS A FACTOR IN CARDIOVASCULAR DISTURBANCES

K. V. Sudakov Jun. 1982 18 p refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 9, Sep. 1981

p 10-18 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76910; NAS 1.15:76910) Avail: Issuing Activity CSCL 06C

Model experimental emotional stress of rabbits and rats in serious conflict situations resulted in cardiovascular disturbances including ischemia and myocardial infarction in some animals. Animals were found to resist, adapt or be predisposed to cardiovascular disturbances. Limbic and reticular structures of the brainstem were found to be involved in changes of cardiac activity and arterial pressure. Individual and genetic differences in predisposition and resistance to cardiovascular disturbance were found in different genetic lines of rats. Catecholamine distribution in brainstem structures of predisposed and resistant rats were determined. Stagnant emotional excitation was found in separate expériments in the hypothalamus and reticular formation of the mesencephalon, resulting in visceral disturbances. This is associated with changes in sensitivity of individual reticular formation neurons. Author

N82-30890*# National Aeronautics and Space Administration, Washington, D. C.
GENETIC AND INDIVIDUAL DIFFERENCES IN CARDIOVASCULAR DISTURBANCES OF RATS DURING EXPERIMENTAL EMOTIONAL STRESS
K. V. Sudakov, V. A. Dushkin, and Ye. A. Yumatov Jun. 1982 17 p refs Transl. into ENGLISH from Vestn. Akad. Nauk SSSR (USSR), no. 12, Dec. 1981 p 32-39 Original language doc. was announced as A82-23278 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by USSR Acad. of Med. Sci., Moscow
(Contract NASw-3541)
(NASA-TM-76911; NAS 1.15:76911) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The arterial pressure and heart rate of rats (Wistar, vay, August, random bred) was continuously recorded in 30 hour and 8 week immobilization emotional stress. Characteristic patterns of arterial pressure and heart rate in 30 hour immobilization were found. Wistar rats had the highest resistance to stress and August rats the least. Criteria were developed to predict cardiovascular disturbances and death from the time variations of blood pressure and heart rate early in immobilization. Significant correlation was found between motor activity and individual and genetic resistance to emotional stress, based on which animals and groups of animals can be selected with known proportions of animals with different degrees of resistance and predisposition to emotional stress. Author

N82-30891*# National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF IMMOBILIZATION STRESS ON DIACYL- AND PLASMALOGEN-DERIVATIVES OF PHOSPHOLIPIDS IN VARIOUS RAT ORGANS AND TISSUES
V. M. Dembitskiy and V. Ye. Ryabinin May 1982 9 p refs Transl. into ENGLISH from Vopr. Med. Khimii (USSR), v. 27, no. 5 Sep. - Oct. 1981 p 698-701 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Chelyabinsk Univ.
(Contract NASw-3541)
(NASA-TM-76852; NAS 1.15:76852) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

A quantitative distribution of plasmalogen and diacyl derivatives of different phospholipids was studied in various rat tissues during immobilization stress. The content of plasmalogens was decreased in various tissues, but the concentration of phosphatidyl acids, lysophosphatidyl choline and phosphatidyl glycerol was increased during the immobilization stress. S.L.

N82-30892*# National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF SENSITIZATION ON DEVELOPMENT OF STRESS GASTRIC ULCERS IN RATS
Yu. S. Malov, A. R. Lapin, and G. P. Pluteshko May 1982 7 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 1, Jan. - Feb. 1981 p 30-33 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76868; NAS 1.15:76868) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The role of emotional stress in the development of gastric ulcers is evaluated. The experimental procedure employing rats as the test subjects is described. Stress factors may cause the development of the ulceration process in the human stomach. S.L.

N82-30893*# National Aeronautics and Space Administration, Washington, D. C.
SPECIFIC CYTOPLASMIC GLUCOCORTICOID RECEPTORS OF RAT LIVER UNDER CONDITIONS OF IMMOBILIZATION STRESS
P. P. Golikov, A. I. Bobkov, and A. S. Bobkova May 1982 9 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 6, Nov. - Dec. 1980 p 20-24 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76863; NAS 1.15:76863) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The binding of dexamethasone and corticosterone by scientific cytoplasmic receptors of the liver was studied on intact and adrenalectomized animals and in those subjected to stress. The receptor hormone complex dissociation constants are calculated according to Scatchard. E.A.K.

N82-30894*# National Aeronautics and Space Administration, Washington, D. C.
SPECIFIC CYTOPLASMIC GLUCOCORTICOID RECEPTORS OF THE RAT LIVER DURING IMMOBILIZATION STRESS
P. P. Golikov, A. I. Bobkov, and A. S. Bobkova May 1982 11 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 66, no. 3, 1980 p 416-421 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76869; NAS 1.15:76869) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Adrenalectomized, intact, and stressed male Wistar rats were analyzed for dexamethasone and corticosterone binding by specific cytoplasmic receptors in the liver. Scatchard analysis provided dissociation constants for receptor hormone complexes. The number of binding sites diminished during stress. It is suggested that measures taken to combat the effects of stress cause increasing steroid receptor interactions in the liver, restoring adaptive enzyme induction, and normalizing metabolic processes. E.A.K.

N82-30895# Army Mobility Equipment Research and Development Center, Fort Belvoir, Va.
INVESTIGATION OF BEHAVIORALLY MODIFIED RATS FOR USE IN EXPLOSIVES DETECTION SYSTEMS Fiscal Year Report, 1976 - 1981
Raymond V. Nolan Dec. 1981 197 p refs
(AD-A114632; MERADCOM-2343) Avail: NTIS HC A09/MF A01 CSCL 19/1

Experiments were devised to improve the reliability and versatility of that class of detector systems currently known as in vivo biosensors. The target substance of interest in this research was the military explosive TNT. The research was designed to prove the validity of four theses: (1) Rats can detect TNT vapor via their olfactory function; (2) Trained rats will operantly signal the arrival of TNT vapor at their nares; (3) Rats may be trained en masse to function as biosensor detection systems; (4) The electroencephalogram (EEG) of trained rats contains specific signals uniquely related to their awareness of TNT vapor. Albino male rats were equipped with four chronic indwelling brain electrodes, three of which were electroencephalograpgh (EEG) pick-off electrodes juxtaposed to the dura mater, while the fourth lead was a stimulus electrode embedded in the medial forebrain bundle (MFB). Electrical brain stimulation (EBS) was applied to the MFB (which has been termed a pleasure center), as a conditioning stimulus during training and reinforcement sessions. Subjects were first conditioned by operant methods to associate

the presence of TNT vapors with EBS and to signal awareness of the target substances by treadle pressing. The four theses postulated above were proven individually. It has thus been demonstrated that properly conditioned rats can, in fact, be utilized as sensory elements in bio-sensor explosives detection systems. GRA

N82-30896# Larc Association, Tempe, Ariz.
BIOFOULING COUNTERMEASURE EVALUATIONS FOR OTEC HEAT EXCHANGERS
R. O. Lewis Jun. 1981 19 p refs
(Contract W-31-109-eng-38)
(DE82-003918; ANL/OTEC-BCM-020) Avail: NTIS HC A02/MF A01

Several promising countermeasure methods for maintaining heat transfer efficiency in OTEC heat exchangers were evaluated. Heat transfer monitors were utilized to evaluate the effectiveness of several countermeasure methods for candidate. OTEC heat exchanger tubing. Countermeasure methods evaluated included the use of abrasive slurries, Amertap sponge rubber balls (alone and in combination with continuous and intermittent chlorination), M.A.N. brush, surfactant/dispersant organic chemical cleaning and continuous and intermittent chlorination. DOE

N82-30897# Harvard Univ., Cambridge, Mass. Div. of Applied Science.
COATINGS FOR THE PREVENTION OF MACROFOULING IN THE OTEC PROGRAM Final Report
Ralph Mitchell and Paul J. Boyle (Policy and Management Associates, Inc.) Jul. 1981 90 p refs
(Contract W-31-109-eng-38)
(DE82-003238; ANL/OTEC-BCM-021) Avail: NTIS HC A05/MF A01

A survey was conducted of antifoulant coatings that are currently available for controlling macrofouling in the marine environment. An overview of macrofouling problems that can be expected in various phases of the OTEC program is presented. The various general types of coatings systems, methods, and construction materials that are presently available for the control of marine macrofouling are summarized. These include copper coatings, organo-metallic coatings, low energy coatings, ablative coatings, antifouling fiber reinforced plastics, antifouling concrete, and electrochemical protection methods. The various available coating compositions and electrochemical methods of macrofouling prevention are described. Commercially available antifouling coatings ar listed. A selected list of marine coatings manufacturers is also provided. A selected bibliography of references on marine macrofouling prevention is included. DOE

N82-30898# Decision Focus, Inc., Palo Alto, Calif.
AN ANALYTIC FRAMEWORK FOR ALLOCATING R AND D RESOURCES AT GRI Annual Report, Sep. 1980 - Jun. 1981
Robert A. Marshalla, Dale M. Nesbitt, and Donna B. Oman Nov. 1981 296 p
(Contract GRI-5080-310-0326)
(PB82-168428; GRI-80/0092) Avail: NTIS HC A13/MF A01 CSCL 05A

A comprehensive technique that eliminates the need for direct subjective estimates of market outcomes was developed. Engineering assessments of technical outcomes are inherently more reliable because they can be unambiguously defined. A comprehensive energy economy model to compute their market impacts on a consistent basis is used. The new technique avoids inconsistencies and explicitly takes into account all technical and economic uncertainties that may afect project areas. The new technique is fully compatible with the PAM and applies to efficient utilization as well as supply project areas. GRA

N82-30899# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 6
16 Jul. 1982 93 p refs Transl. into ENGLISH from various Russian articles
(JPRS-81300) Copyright. Avail: Issuing Activity

Nonionizing electromagnetic radiation and its biological and physiological effects on animals and humans was studied. The following topics are discusse: stimulating effects of exposure of rat sterum to variable magnetic fields on antibody production in the spleen; biological and therapeutic effects of magnetic fields; different nervous sytem reactions; systematic adaptation reactions; use of magnetbiological effects in neurosurgery; changes in peripheral circulation in limbs during bone regeneration; changes in transcapillary metabolism in chronic venous insufficiency of legs; chromatin of rat brain neurons and nucleic acids of muscles as related to localization of decimeter waves during exercise; heat distribution in tissues; low frequency effects on animals of different ages; meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene; effects of microwave radiation and resitance to ionizing radiation; effects of single exposure to microwaves on quantity and functional properties of T and B lymphocytes; and cytogenetic and gonadotozic effects of static electric fields. For individual titles, see N82-30900 through N82-30916.

N82-30900# Joint Publications Research Service, Arlington, Va.
STIMULATING EFFECT OF EXPOSURE OF RAT STERNUM TO VARIABLE MAGNETIC FIELD ON ANTIBODY PRODUCTION IN THE SPLEEN
O. F. Melnikov, A. A. Diyesperova, E. A. Bakay, and A. I. Rudoy *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 1-5 refs Transl. into ENGLISH from Fiziol. Zh. (Kiev), v. 28, no. 1, Jan. - Feb. 1982 p 109-112 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

The possibility of stimulating antibody production by exposing the sternum, at the projection of the thymus, to a variable frequency magnetic field was investigated. Agents capable of selectively altering functional activity of the immunogenetic system were studied. Physical factors along with biological agents are used, most often from thymus tissue and their synthetic analogues. It is demonstrated that exposure to variable electromagnetic fields could activate antibody genesis. Besides the entire lymphoid tissue system, other organs and systems are exposed to magnetic fields, which is not always desirable. E.A.K.

N82-30901# Joint Publications Research Service, Arlington, Va.
STATUS AND PROSPECTS OF RESEARCH ON BIOLOGICAL AND THERAPEUTIC EFFECTS OF MAGNETIC FIELDS **c52**
V. M. Bogolyubov *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 6-10 Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Kult. (Moscow), no. 4, Jul. - Aug. 1981 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

Biological effects of magnetic fields (MF) on physiological aspects and general questions in appreciation of this factor were examined. Therapeutic use of MF, magnetohygiene, magnetoecology, biomagnetism is discussed. Biotropic parameters of MF which refer to the physical characteristics of the field that determines the mechanisms of its interaction with biological systems, as well as biological effects was formed in magnetobiology. Intensity, gradient, vector frequency and shape of pulses, as well as duration of exposure are among the main biotropic parameters of MF. E.A.K.

N82-30902# Joint Publications Research Service, Arlington, Va.
DISTINCTIONS OF NERVOUS SYSTEM REACTIONS TO ARTIFICIALLY INTENSIFIED MAGNETIC FIELDS **c52**
Yu. A. Kholodov *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 11-15 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 5-9 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

The reaction of the body systems to exogenous, intensified magnetic fields (MF) was studied. Body systems are ranked in the following order according to extent of involvement in reacting to total body exposure to MF: nervous, endocrine, sense organs, cardiovascular, blood, digestive, muscles, excretory, respiratory, integument and bone. The presence of both local changes and

reactions by systems not directly exposed to local MF shows that regulatory system, nervous and endocrine, is involved in reactions to MF. The distinctions of some reactions of the nervous system to MF are discussed. E.A.K.

N82-30903# Joint Publications Research Service, Arlington, Va.

MECHANISM OF BIOLOGICAL EFFECTS OF MAGNETIC FIELDS **c52**

N. A. Udintsev *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 16-0 refs Transl. into ENGLISH from Vopr. Kurotol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 9-12 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

Magnetic fields (MF) of different intensities and frequencies are used more extensively for treatment of diseases of the skeletomuscular system, vessels and gastrointestinal tract. The mechanism of biological effects of MF, like other physiotherapeutic factors, a systemic organization of functions were investigated. The state of the neuroendocrine system and metabolism after total body exposure of white rats to variable MF (VMF) with 20 mT induction and at a frequency of 50 Hz was studied. Data obtained during brief exposure to MF are presented. E.A.K.

N82-30904# Joint Publications Research Service, Arlington, Va.

FORMATION OF SYSTEMIC ADAPTATION REACTIONS IN STATIC MAGNETIC FIELDS **c52**

M. A. Shishlo, S. Kh. Kubli, and L. L. Shimkevich *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 21-27 refs Transl. into ENGLISH from Vopr. Kurortol. Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 12-18 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

The activation of compensatory and adaptive processes, as well as formation of systemic adaptive reactions which enhance resistance to deleterious environmental factors, during exposure to magnetic fields were examined. Animals were exposed daily to static magnetic field (SMF), with a large volume of tissues in the field interaction. An increase in dispersion of resistance without change in its mean level after two SMF treatments was observed. By the 8th to 9th da reliable increase in resistance decreased substantially. It is found that under the influence of many weeks of exposure to magnetic fields fluctuations of these parameters persist but their amplitude gradually disappears. E.A.K.

N82-30905# Joint Publications Research Service, Arlington, Va.

POSSIBLE USE OF MAGNETOBIOLOGICAL EFFECTS IN NEUROSURGERY **c52**

R. P. Kikut, M. E. Liyepa, G. A. Kruminya, S. R. Kikute, E. A. Vitols, and D. L. Apshkalne *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 28-33 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 18-24 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

The use of magnetic fields (MF) in neurosurgery was studied. The possibility of using magnetobiological effects in the presence of neurovascular, neurooncological and inflammatory diseases of the central nervous system involving adhesive and glial processes was explored. The biological effects of MF are investigated and new methods of treating neurosurgical patients, which could supplement or replace existing surgical methods are developed. Data on the use of MF in neurosurgery and magnetic property of attracting ferromagnetic particles are provided. E.A.K.

N82-30906# Joint Publications Research Service, Arlington, Va.

CHANGES IN PERIPHERAL CIRCULATION OF LIMBS DURING BONE REGENERATION UNDER INFLUENCE OF LOW-FREQUENCY MAGNETIC FIELDS **c52**

I. M. Mitbreyt, G. I. Lavrishcheva, and V. A. Dirin *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 34-38 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 24-27 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

Reparative regenerative processes in bone tissue are largely determined by the state of circulation in the injured limb segment. The role of peripheral circulation in the extremity in the mechanism of action of low frequency magnetic fields (MF), on reparative regeneration of bone was investigated. It is indicated that MF at a frequency of 50 Hz, an induction of 10 mT under both experimental and clinical conditions, has a marked effect on peripheral circulation in extremities and improve tissular trophics in the course of bone regeneration in fractures of the distal epimetaphysis of the radius. E.A.K.

N82-30907# Joint Publications Research Service, Arlington, Va.

CHANGES IN TRANSCAPILLARY METABOLISM IN PATIENTS WITH CHRONIC VENOUS INSUFFICIENCY OF LEGS UNDER INFLUENCE OF STATIC MAGNETIC FIELDS **c52**

B. N. Zhukov, L. A. Trufanov, and S. M. Musiyenko *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 39-43 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 28-31 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

Magnetotherapy in the treatment of peripheral vascular diseases was investigated. Experimental and clinical data are collected and indicated the beneficial effects of magnetic fields (MF) on some forms of vascular pathology. However, the mechanism of therapeutic action of MF, with indications and contraindications for its use have not yet been investigated sufficiently. Transcapillary metabolism and microcirculation in patients with chronic venous insufficiency of the legs were studied. Biophysical parameters which were monitored dynamically are presented. E.A.K.

N82-30908# Joint Publications Research Service, Arlington, Va.

CHROMATIN OF RAT BRAIN NEURONS AND NUCLEIC ACIDS OF MUSCLES AS RELATED TO LOCALIZATION OF DECIMETER WAVES DURING EXERCISE **c53**

Z. A. Sokolova *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 44-47 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 35-38 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

The effects of different localizations of DMW on structural and functional state of chromatin (deoxyribonucleoprotein--DNP) of cerebral neuronal nuclei and nucleic acid content of rat muscles during intensive physical exercise were studied. Experiments were conducted on 60 white male Wistar rats weighing 180 to 220 g. The physical load consisted of graded daily swimming in fresh water at a temperature of 28 to 32 deg for 4 weeks. DMW were generated by a Volna 1 unit (emitter with 4 cm diameter, intensity of 120 mW/sq cm). The waves were delivered to the region of the femoral muscles, adrenals or head for 3 min/day to a total of 10 times. S.L.

N82-30909# Joint Publications Research Service, Arlington, Va.

DISTRIBUTION OF HEAT IN BIOLOGICAL TISSUES UNDER INFLUENCE OF UHF ELECTROMAGNETIC FIELDS

P. V. Svetitskiy *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 48-53 refs Transl. into ENGLISH from Med. Braiol. (Moscow), v. 27, no. 3, Mar. 1982 p 46-49 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

The link between nature of distribution of generated heat in biological tissues and technical parameters is determined in order to control the biological effects of UHF EMF hyperthemia. The same intensity of exogenous EMF can elicit different levels of induced endogenous EMF, for which reason there is a change in heating of tissues. This phenomenon depends on the size and shape of biological objects, their orientation in relation to EMF vectors, morphological structures and electric properties of tissues, and intensity of energy emission by tissues as a result of vital functions. The distribution of heat in biological tissues

exposed to UHF radiation was studied, in order to serve as a guide for clinical work. S.L.

N82-30910# Joint Publications Research Service, Arlington, Va.

EFFECTS OF LOW-FREQUENCY (50 Hz) ELECTRIC FIELDS ON ANIMALS OF DIFFERENT AGES

I. P. Kazyarin *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 54-57 refs Transl. into ENGLISH from Gigiyen. Sanitariya (Moscow), no. 8, Aug. 1981 p 18-19 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

The comparative sensitivity of young (growing) and old animals to 50 Hz electric fields was examined. The biological mode consisted of 40 male white rats 1.5 to 2 months of age, weighing 90 to 100 g, and 1.5 to 2 years old, weighing 400 to 500 g, which were divided into 4 groups of 10 animals. The 1st group (young) and 3d (old) group served as a control, while the rats in the 2d and 4th groups were exposed daily to commercial frequency electric fields (CFEF) of 15 kV/m for 30 min a day, for 2 months. For this purpose, the animals were placed in special dielectric cages with simulated electric field of 50 Hz generated by means of high voltage tank [oil] transformers. The animals' condition was assessed on the basis of dynamics of body weight, static work capacity, summation threshold index, latency period of unconditioned reflex, duration of hexenal induced sleep, overall exchange of gases and blood cholinesterase activity. These parameters were determined before the experiment (background data) and every 2 weeks during exposure. S.L.

N82-30911# Joint Publications Research Service, Arlington, Va.

METEOROLOGICAL RADAR AS SOURCE OF SHF ELECTROMAGNETIC FIELD ENERGY AND PROBLEMS OF ENVIRONMENTAL HYGIENE c52

Yu. D. Dumanskiy, N. G. Nikitina, L. A. Tomashevskaya, F. R. Kholyavko, K. S. Zhupakhin, and V. a. Yurmanov *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 58-63 refs Transl. into ENGLISH from Gigiyen. i Sanitariya (Moscow), no. 2, Feb. 1982 p 7-11 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

The electromagnetic situation at locations of meteorological radar stations (MRS) and biological implications of electromagnetic fields generated by radar devices used for meteorological purposes was studied. The specifications of the MRS and their operating modes were determined, and the patterns of distribution of electromagnetic energy generated by MRS in the environment was established. A method was developed to measure electromagnetic fields in the superhigh frequency range using instruments and calculations. S.L.

N82-30912# Joint Publications Research Service, Arlington, Va.

EFFECTS OF MICROWAVE RADIATION ON MOUSE HEMOPOIETIC STEM CELLS AND ON ANIMAL RESISTANCE TO IONIZING RADIATION

D. Rotkovska, A. Vacek, and A. Bartonickova *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81200) 16 Jul. 1982 p 64-69 refs Transl. into ENGLISH from Radiobiol. (Moscow), v. 21, no. 4, Jul. - Aug. 1981 p 558-562 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

The effects of microwave (MW) on hemopoiesis in mice are discussed. Stimulation of colony-forming capacity of bone marrow and the spleen was demonstrated after total body exposure of mice for 5 min at the parameters used. This MW effect was used to enhance mouse resistance to ionizing radiation. S.L.

N82-30913# Joint Publications Research Service, Arlington, Va.

EFFECT OF SINGLE EXPOSURE TO MICROWAVES ON QUANTITY AND FUNCTIONAL PROPERTIES OF T AND B LYMPHOCYTES OF GUINEA PIG AND MOUSE SPLEEN

I. A. Rudakov, S. F. Rudakova, I. V. Rizhinskaya, and O. S. Ogurtsova *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 70-74 refs Transl. into ENGLISH from Radiobiol. (Moscow), v. 21, no. 4, Jul. - Aug. 1981 p 626-629 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

Parameters of cellular immunity of animals at different intervals following single exposure to microwaves of thermal intensity were studied. The first series of experiments was performed with guinea pigs weighing 300 to 400 g, who were submitted to single total body exposure to microwaves in the reactive zone using a Luch 58 unit (frequency 2375 MHz, distance from emitting antenna horn 30 cm, output power 100 W, exposure 15 min). As a result of such exposure, the animals' body temperature rose by 4 to 4.5 C. Immediately after irradiation, as well as 1, 4, 7, and 21 days later, the animals were sacrificed; the spleen was excised under sterile conditions and a pooled suspension of spleen cells from 3 to 5 animals was obtained, which was then used to assess spontaneous and concanavalin A induced lymphocyte blast transformation by recording radioactivity of H3 thymidine incorporated in DNA. S.L.

N82-30914# Joint Publications Research Service, Arlington, Va.

MAIN DIRECTIONS OF SOVIET RESEARCH ON BIOLOGICAL EFFECTS OF MICROWAVE RADIATION c52

M. G. Shandala, M. I. Rudnev, Ye. F. Stoyan, and G. I. Vinogradov *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 75-80 refs Transl. into ENGLISH from Gigiyen. i Sanitariya (Moscow), no. 10, Oct. 1981 p 4-7 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

The effects of low intensity microwaves, ranging from 1 to 1000 microwatt/sq cm. Biological validation of standards on the basis of experimental research and studies of the health status of individuals residing in areas where this factor is present to some degree is considered to be the only correct approach to the problem of setting standards for microwave. Strict simulation of irradiation conditions in animal experiments enables the nature, degree, and main patterns of biological effects, including deleterious effect of the factor, as a function of its intensity, duration of exposure, wavelength and other variables to be determined. Special attention is given to the choise of tests characterizing the functional state of the organism. S.L.

N82-30915# Joint Publications Research Service, Arlington, Va.

CYTOGENETIC AND GONADOTOXIC EFFECTS OF STATIC ELECTRIC FIELDS c52

K. I. Stankevich, I. N. Badayeva, L. V. Samosh, and L. Z. Shumova *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 81-84 refs Transl. into ENGLISH from Gigiyen. i Sanitariya (Moscow), no. 10, Oct. 1981 p 9-11 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

The effects of static electric fields on morphological and genetic structures of testicular cells of white mongrel mice was studied. The effects according to incidence of cytogenetic disturbances in meiotic chromosomes at the diakinesis-metaphase Istage in male mice was evaluated; preparations of testes were submitted to histological analysis. Experiments were conducted on a device, which consists of a chamber for experimental animals, double plated electrodes, adjustable brackets, aerofranklinizer connected into the power line and a kilovoltmeter. Field intensity in the chambers was regulated with the aerofranklinizer switch and distance between electrodes, on the basis of E = V/H, where E is field intensity, V is voltage on the kilovoltmeter scale and H is distance between electrodes. S.L.

N82-30916# Joint Publications Research Service, Arlington, Va.

EFFECTS OF SUPERHIGH FREQUENCY ELECTROMAGNETIC FIELDS ON ANIMALS OF DIFFERENT AGES

O. I. Shutenko, I. P. Kozyarin, and I. I. Shvayko *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 85-90 refs Transl. into ENGLISH from Gigiyen. i Sanitariya (Moscow), no. 10, Oct. 1981 p 35-38 (For primary document see N82-30899 21-51)

Avail: Issuing Activity

Effects of superhigh frequency (SHF) electromagnetic fields (EMF) on young (growing) and mature animals were tested. The experimental model consisted of 90 male white rats initially

weighing 70 to 80 and 160 to 200 g, which were divided into 6 groups of 15 animals in each, depending on intensity of the factor used. The animals of the first (young) and fourth (puberal) groups served as a control. The second, third (young) and fifth, sixth (mature) groups were exposed to an SHF field with energy flux density (EFD) of 10 and 100 microwatts/sq cm, respectively, for 2 h/day over a period of 10 weeks. We used the Luch-58 magnetron SHF generator, at working frequency of 2375 + or - 50 MHz (wavelength 12.6 cm) as the source of SHF radiation. The animals were irradiated in groups in the zone of the formed field in an ordinary room with cinder block walls (temperature 18 to 20 C, humidity 40 to 60%). We used a PO 1 instrument (Medik 1) for dosimetry. We measured EFD of the SHF field over the entire area of the room. The animal cages were placed in areas where the fields constituted 10 and 100 microwatts/sq cm. S.L.

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-30917* National Aeronautics and Space Administration, Washington, D. C.

AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY WITH INDEXES

May 1982 150 p

(NASA-SP-7037(148); NAS 1.21:7037(148)) Avail: NTIS HC $5.00 CSCL 06E

This bibliography lists 512 reports, articles and other documents introduced into the NASA scientific and technical information system in April 1982. E.A.K.

N82-30918*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF HYPOKINESIA ON SOME RED BLOOD INDICES AND THE CONDITION OF REGULATORY SYSTEMS

B. M. Fedorov, V. S. Nevstruyeva, and G. D. Reushkina May 1982 12 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 4, 1980 p 61-65 Transl. by SCITRAN, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76752; NAS 1.15:76752) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06P

Hypokinesia induces a decrease in the catecholamine level in the hypothalamic, myocardial and adrenal tissues of rabbits and a decrease in the erythrocyte count and hemoglobin content. Two intravenous strophanthin injections given in different periods of hypokinesia lasting up to 12 to 60 days promote the normalization of the values of hormonal mediator metabolism; the red blood values are normalized only in the early periods of hypolinesia. R.J.F.

N82-30919*# Technology, Inc., Houston, Tex. Life Sciences Div.

A GENERAL PURPOSE DATA ACQUISITION AND ANALYSIS SYSTEM FOR NYSTAGMUS AND RELATED DATA

William G. Crosier Feb. 1982 261 p

(Contract NAS9-14880)

(NASA-CR-167704; NAS 1.26:167704) Avail: NTIS HC A12/MF A01 CSCL 06P

A system for collecting and analyzing nystagmus and related data is described. The system uses commercially available equipment for performing caloric irrigation and rotating chair tests on human subjects in order to evaluate certain characteristics of the human vestibular system. Three programs and their associated subprograms which are used with a laboratory microcomputer to perform three primary tasks are discussed. These include: (1) control and collect data in real time from a nystagmus experiment, (2) analyze data from eye movements and related signals in order to measure such variables as eye velocities, and (3) provide hard copy formatted reports for reduced test data. S.L.

N82-30920# Medical Research Council, Cambridge (England). Applied Psychology Unit.

COGNITIVE PERFORMANCE, SLEEP QUALITY AND MOOD DURING DEEP OXY-HELIUM DIVING

Vivien J. Lewis and Alan D. Baddeley Jan. 1981 32 p refs (RNP-1/81; BR79073) Avail: NTIS HC A03/MF A01

A series of simulated saturation oxyhelium dives, examining physiological and psychological changes in man in high pressure conditions were studied. A series of five dives are reported, lasting between 18 and 26 days, and reaching maximum depths of between 300 msw and 540 msw. Tests of cognitive functioning, including associative and short term memory, arithmetic ability, perceptual speed, spatial manipulation, grammatical reasoning and semantic processing, were administered to well practiced subjects prior to each dive, at maximum depth and again during decompression. Self report measures of sleep and mood questionnaires were administered for a period extending from one week before each dive commenced until at least one week after the dive was completed. S.L.

N82-30921# Royal Signals and Radar Establishment, Malvern (England).

MEDICAL THERMOGRAPHY WITH A PYROELECTRIC VIDICON CAMERA

D. E. Burgess Mar. 1981 17 p refs Original contains color illustrations

(RSRE-3365; BR79226) Avail: NTIS HC A02/MF A01

A pyroelectric vidicon camera for use in medical thermography is discussed. The equipment used and the results obtained are described. B.W.

N82-30922*# National Aeronautics and Space Administration, Washington, D. C.

RNA ACCUMULATION IN THE BODY OF NEURONS AS AN INDICATOR OF THEIR FUNCTIONAL DEAFFERENTATION

V. A. Klenikova and L. D. Malinauskayte Apr. 1982 10 p refs Transl. into ENGLISH from Fiz. Zh. SSSR (USSR), v. 6, no. 3, 1980 p 339-343 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76850) Avail: Issuing Activity CSCL 06P

Using two wave cytospectrophotometry in the ultraviolet and visible regions of the spectrum, it is shown that prolonged functional deafferentation, evoked by visual deprivation or induced hypokinesia, caused a pronounced accumulation of RNA in the visual neurons of the cerebral cortex and in the motor neurons of the spinal cord, respectively. A similar, although quantitatively less considerable, accumulation of RNA is noted with intensified stimulation of these neurons, whereas a combination of deafferentation and stimulation weakened, and in a number of cases completely eliminated, the accumulation of RNA, evoked by deafferentation. The obtained data indicate that the accumulation of RNA in the body of neurons may serve as an indicator not so much of intensified, but, conversely, weakened sensory pulsation. In the latter case, the mechanism of this accumulation is associated with the weakening of utilization of RNA by the neurons. Author

N82-30923*# National Aeronautics and Space Administration, Washington, D. C.

EFFICACY OF CIMETIDIN IN THE PREVENTION OF ULCER FORMATION IN THE STOMACH DURING IMMOBILIZATION STRESS

G. I. Dorofeyev, I. A. Litovskiy, L. K. Gavrovskaya, and V. T. Ivashkin May 1982 9 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 6, Nov. - Dec. 1980 p 24-27 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Dept. of Hospital Therapy, S. M. Kirov Military Medical Academy, Leningrad

(Contract NASw-3542)

(NASA-TM-76864; NAS 1.15:76864) Avail: NTIS HC A02/MF A01 CSCL 06E

The effect of stress on the formation of ulcers in the mucous membrane of the stomach, the increase in cyclic adenosine monophosphate level in the gastric tissues, and parietal cell structure alteration. Use of cimetidin prevents these effects Author

N82-30924*# National Aeronautics and Space Administration, Washington, D. C.
THE ROLE OF THE HYPOPHYSIS IN EARLY REACTION OF HEMOPOIETIC ORGANS TO STRESS
Yu. B. Deshevoy May 1982 9 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 2, Mar. - Apr. 1980 p 50-54 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76865) Avail: Issuing Activity CSCL 06P

Rats are used in experiments to study the role of the hypophysis in the reaction of the hemopoietic organs during the early period of stress reactions. Results show that preliminary hypophysectomy prevents the reduction in the number of lymphoid cells in the thymus, but has no effect on the devastation of the spleen. S.L.

N82-30925*# National Aeronautics and Space Administration, Washington, D. C.
REACTION TO HYPOKINESIA AND HYPERKINESIA OF SOMATOCHROME NEURONS IN THE MOTOR ZONE OF THE CEREBRAL CORTEX IN RABBITS
L. A. Zaruba Jun. 1982 8 p refs Transl. into English from Vestn. Zool. (USSR), no. 3, 1979 p 61-63 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76885; NAS 1.15:76885) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06P

A group of rabbits were subjected to limited mobility for 2-2.5 months, another group to daily moderate running exercise on a treadmill during 3, 5, 8 and 9 months with a 3rd group serving as control. Analysis of sections of the cerebral cortex motor zone revealed that a presence of impulses coming from peripheral receptors was necessary for a normal activity of nerve cells. The 2 months hypokinesia disturbed the metabolism of nerve cells. In the absence of peripheral stimulation the size of the cell body decreased due to water disturbance in the cell. By 2.5 months the animals adapted to hypokinesia and differences in volume of the neuron, its nucleus and RNA content in neurons became insignificant. Long-term flow of stimulation from the periphery resulted in increased protoplasm mass while the volume of the nerve cell nucleus increased comparatively less. Prolonged increase of nerve cell activity heightened the expenditure of RNA. In this case the RNA functioned as the energy source which was necessary for protein synthesis by the cell. Author

N82-30926*# National Aeronautics and Space Administration, Washington, D. C.
STATE OF THE ENDOCRINE GLANDS IN HYPODYNAMIA (A REVIEW OF THE LITERATURE)
V.I. Korkach May 1982 16 p refs Transl. into ENGLISH from Vrach. Delo (USSR), no. 2, Feb. 1981 p 11-16 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76906; NAS 1.15:76906) Avail: Issuing Activity CSCL 06B

The effect of hypodynamia on gland secretion in humans and animals was studied. The glands investigated included the thymus, thyroid, hypothalamus, and adrenal glands. S.L.

N82-30927*# National Aeronautics and Space Administration, Washington, D. C.
CONTROL OF MUSCLE ACTIVITY IN UNLOADED CONDITIONS
A. V. Kovalik May 1982 7 p refs Transl. into ENGLISH from Gig. Tr. Prof. Zabol. (USSR), no. 8, Aug. 1981 p 44-45 Original language document announced as A82-15712 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76883; NAS 1.15:76883) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06P

The ability of human test subjects to voluntarily tense specific muscle groups was. It was shown that less tension is generated than in overcoming an external load and that muscles of the upper half of the body are generally more controllable and generate greater tension than those of the lower half of the body. It is also noted that voluntary muscle tension can be generated in any sequence of muscle groups and for at least 3 hours continuously. It is found that 2 weeks of training produces greatly improved precision and selectivity on muscle tensing. E.A.K.

N82-30928# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
PULMONARY FUNCTION MEASURES BEFORE AND AFTER EXPOSURE OF HUMAN SUBJECTS TO +G(z) AND +G(x) ACCELERATION LOADS
Edwin Hendler 28 Sep. 1981 25 p refs
(ZR0000101)
(AD-A114652; NADC-81236-60) Avail: NTIS HC A02/MF A01 CSCL 06/19

Baseline dynamic lung volume measurements were determined on four subjects seated upright or reclined, both with and without inflation of an anti-G suit (AGS). Additional measurements were made before and after exposing the subjects to double acceleration pulses using the NADC Dynamic Flight Simulator. During the acceleration exposures, the subjects were either seated upright or were reclined; they wore an inflated AGS and either did or did not perform the M-1 maneuver. Acceleration pulses lasted 20 or 40s, and ranged in magnitude from 3 to 7 G. The effects of body position, G-protective clothing, and acceleration exposure on pulmonary function measures derived from flow-volume loops are described. GRA

N82-30929# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AIRCREW IONIZING DOSES FROM RADIOACTIVE DUST CLOUD GENERATED BY NUCLEAR BURST M.S. Thesis
Burl E. Hickman Mar. 1982 77 p refs
(AD-A115541; AFIT/GNE/PH/82M-9) Avail: NTIS HC A05/MF A01 CSCL 06/18

This report will evaluate the threat of radioactive fallout to which aircrew members will be exposed when flying through a descending fallout cloud. A computer program is developed for calculating the ionizing dose rate of a radioactive dust cloud as a function of time, and also the dose that an aircrew receives when flying through the respective cloud. A cloud model that is patterned after the AFIT fallout smearing code was developed. A comparison is made between the activities at various altitudes from 305 meters to 9150 meters to provide information for possible re-direction of flight. The external ionizing dose to the aircrew is computed by the new code considering the cloud size, the aircraft's transit time through the cloud, and the ingestion rate of radioactive particles into the aircraft's cabin. Information is also provided to indicate the method by which doses can be computed from a cloud of multiple bursts. The results demonstrate that total dose to each aircrew member is approximately 8 rems after flying through a fallout cloud one hour after cloud stabilization of a 1 Mt burst, with the mission continuing for eight hours subsequent to the cloud transit. Author (GRA)

N82-30930# Naval Submarine Medical Research Lab., Groton, Conn.
POSITION PAPER: THE TOXIC EFFECTS OF CHRONIC EXPOSURE TO LOW LEVELS OF CARBON DIOXIDE Interim Report
19 Jan. 1982 46 p refs
(AD-A115053; NSMRL-973) Avail: NTIS HC A03/MF A01 CSCL 06/20

Numerous patrol studies have provided a sizable data base of levels of CO2 exposure and health problems encountered by Naval nuclear submariners. Humans have been exposed to a variety of concentrations of CO2 for chronic periods of time aboard submarines, as well as in laboratory environments. Mean data, PICO2 = 10 torr and 40 days, collectively represent this wide variety of CO2 exposures. Physiological responses to the CO2 environment were repeatedly documented, but toxic effects were not apparent. Human exposure tests were safely conducted in atmospheres containing up to 5 torr CO2, for up to 90 days. Such exposures are therefore considered safe at this time. Animal studies showed that chronic, low-level, CO2 exposures caused changes of the bone content of CO2, the bone content of calcium, the soft tissue content of calcium, and histological changes of the lung. These changes were found to be completely reversible

upon discontinuance of the animal's exposure to CO2. The extrapolation of the animal data to humans is a current problem in the advancement of our understanding of the effects of CO2 on humans. GRA

N82-30931# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A CORTICALLY IMPLANTABLE MULTIELECTRODE ARRAY FOR INVESTIGATING THE MAMMALIAN VISUAL SYSTEM M.S. Thesis

George W. German, III Dec. 1981 107 p refs
(AD-A115484; AFIT/GE/EE/81D-24) Avail: NTIS HC A06/MF A01 CSCL 06/16

The research conducted during this study is a continuation of the Tatman-Fitzgerald (DTIC AD A080378, AD A100763) fabrication and testing of an implantable, multiplexed, multi-electrode array that will be used to record the bioelectric signals emitted from the visual cortex of a live, visually functional animal. Primary emphasis of this study is the investigation of passivation materials that can be used to protect the AFIT Multielectrode Array from the harsh cerbrospinal environment encountered inside the cranium. Secondary emphasis is placed on analyzing the electrical characteristics of an AFIT JFET, designing an improved multiplexing drive circuit, and testing the system equipment with an operational device. Author (GRA)

N82-30932# Los Alamos Scientific Lab., N. Mex.

BIOLOGICAL AVAILABILITY OF NICKEL ARSENIDES: TOXIC EFFECTS OF PARTICULATE Ni5As2

L. R. Gurley, R. A. Tobey, J. G. Valdez, M. S. Halleck, and S. S. Barham (Mayo Clinic, Rochester, Minn.) 1981 29 p refs Presented at the 21st Hanford Life Sci. Symp. on Biol. Availability of Trace Metals, Richland, Wash., 4-8 Oct. 1981
(Contract W-7405-eng-36)
(DE82-000580; LA-UR-81-2708; CONF-811035-1) Avail: NTIS HC A03/MF A01

The toxicity of nickel arsenides was studied to determine if fugitive nickel arsenides from an oil shale retort could pose a threat to personnel in the workplace or to other living organisms in the environment. Considerations of: oil shale retort operating conditions, oil shale elemental composition, nickel and arsenic physicochemical properties, and oil shale matrix structure suggest that nickel arsenides may be formed during the oil shale retorting process. Similarities between nickel subarsenide and nickel subsulfide and nickel subselenimide, both of which are known potent carcinogens, have caused concern that nickel arsenides may have adverse effects on biological systems. Five stable nickel arsenides and nickel arsenic sulfide are considered possible species for study. GRA

N82-30933# Wuerzburg Univ. (West Germany). Inst. fuer Toxikologie.

INVESTIGATION ON THE CARCINOGENIC EFFECT OF TRICHLORETHYLENE BY INHALATION AND MECHANISMS OF METABOLIC BIOACTIVATION Final Report, May 1980

Dietrich Henschler Bonn Bundesministerium fuer Forschung und Technologie Mar. 1982 22 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-HA-82-007; ISSN-0171-7618) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4.60

Trichloroethylene, one of the most frequently used solvents, was studied as a carcinogen on account of the chemical relationship to vinylchloride. To test this, systematic inhalation experiments were performed on three animal species (mice, rats, hamsters) at 100 ppm and 500 ppm, 6 h/day, 5 days/week for 18 months. In parallel the biochemical level was measured, providing insight into the mechanism of action of the compound. Macroscopic and microscopic evaluation of all tissues of the experimental animals after spontaneous death reveals no increase in the rates of benign and malignant tumors in the exposed group above the controls. In female mice, there is a dose related increase in the rate of malignant lymphomas which is, however, believed to be a nonspecific activation of virus infestation. The results show that long-term inhalation of trichloroethylene, even in high concentrations, renders no indication of a carcinogenic risk. The results of this investigation stand against the worldwide suspicion that trichloroethylene, a very frequently used solvent in the work area as well as in household environments, presents a carcinogenic risk. Author (ESA)

N82-30934# Environmental Protection Agency, Washington, D.C. Office of Noise Abatement and Control.

DETAILED RESEARCH PLAN: CARDIOVASCULAR EFFECTS OF NOISE

Dec. 1981 83 p
(PB82-163379; EPA-550/9-81-104) Avail: NTIS HC A05/MF A01 CSCL 06S

The effects of long term (acoustical) noise exposure on the cardiovascular system, the best documented of the nonauditory physiological effects of noise and the greatest potential public health issue are discussed. A plan was developed which includes the following items: (1) a summary of what is known from short term and long term studies; (2) detailed multicomponent plans for animal experimental studies, human epidemiologic studies, and human experimental studies; (3) discussion of recent research; and (4) analysis of five options. It is estimated that if research proceeds according to this plan, decision points will occur in year 3, year 6 and year 8. GRA

N82-30852*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

A PERFORMANCE ANALYSIS STUDY OF A COMPLEX G FIELD EXPERIMENT

D. W. Repperger *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 292-315 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 06S

N82-30854*# Connecticut Univ., Storrs. Dept. of Electrical Engineering and Computer Science.

MODELING LATERAL ACCELERATION EFFECTS ON PILOT PERFORMANCE

Jonathan Korn and David L. Kleinmen *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 340-348 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 06S

N82-30855*# Systems Technology, Inc., Hawthorne, Calif.

A COMPREHENSIVE SYSTEM MODEL FOR MOTION/SPACE SICKNESS: PRELIMINARY RESULTS

Susan A. Riedel *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 349-368 refs (For primary document see N82-30833 21-51)
(Contract NAS2-10430)
Avail: NTIS HC A99/MF A01 CSCL 06P

N82-30867*# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.

THE ROLE OF ANTAGONIST COACTIVATION IN THE CONTROL OF NATURAL MOVEMENT

Neville Hogan *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 571-583 refs (For primary document see N82-30833 21-51)
(Grant NSF PFR-79-17348)
Avail: NTIS HC A99/MF A01 CSCL 06P

N82-30901# Joint Publications Research Service, Arlington, Va.

STATUS AND PROSPECTS OF RESEARCH ON BIOLOGICAL AND THERAPEUTIC EFFECTS OF MAGNETIC FIELDS

V. M. Bogolyubov *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 6-10 Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Kult. (Moscow), no. 4, Jul. - Aug. 1981 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

N82-30902# Joint Publications Research Service, Arlington, Va.

DISTINCTIONS OF NERVOUS SYSTEM REACTIONS TO ARTIFICIALLY INTENSIFIED MAGNETIC FIELDS

Yu. A. Kholodov *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 11-15 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4,

Jul. - Aug. 1981 p 5-9 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

N82-30903# Joint Publications Research Service, Arlington, Va.
MECHANISM OF BIOLOGICAL EFFECTS OF MAGNETIC FIELDS
N. A. Udintsev *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 16-0 refs Transl. into ENGLISH from Vopr. Kurotol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 9-12 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

N82-30904# Joint Publications Research Service, Arlington, Va.
FORMATION OF SYSTEMIC ADAPTATION REACTIONS IN STATIC MAGNETIC FIELDS
M. A. Shishlo, S. Kh. Kubli, and L. L. Shimkevich *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 21-27 refs Transl. into ENGLISH from Vopr. Kurortol. Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 12-18 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

N82-30905# Joint Publications Research Service, Arlington, Va.
POSSIBLE USE OF MAGNETOBIOLOGICAL EFFECTS IN NEUROSURGERY
R. P. Kikut, M. E. Liyepa, G. A. Kruminya, S. R. Kikute, E. A. Vitols, and D. L. Apshkalne *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 28-33 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 18-24 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

N82-30906# Joint Publications Research Service, Arlington, Va.
CHANGES IN PERIPHERAL CIRCULATION OF LIMBS DURING BONE REGENERATION UNDER INFLUENCE OF LOW-FREQUENCY MAGNETIC FIELDS
I. M. Mitbreyt, G. I. Lavrishcheva, and V. A. Dirin *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 34-38 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 24-27 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

N82-30907# Joint Publications Research Service, Arlington, Va.
CHANGES IN TRANSCAPILLARY METABOLISM IN PATIENTS WITH CHRONIC VENOUS INSUFFICIENCY OF LEGS UNDER INFLUENCE OF STATIC MAGNETIC FIELDS
B. N. Zhukov, L. A. Trufanov, and S. M. Musiyenko *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 39-43 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 28-31 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

N82-30911# Joint Publications Research Service, Arlington, Va.
METEOROLOGICAL RADAR AS SOURCE OF SHF ELECTROMAGNETIC FIELD ENERGY AND PROBLEMS OF ENVIRONMENTAL HYGIENE
Yu. D. Dumanskiy, N. G. Nikitina, L. A. Tomashevskaya, F. R. Kholyavko, K. S. Zhupakhin, and V. a. Yurmanov *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 58-63 refs Transl. into ENGLISH from Gigiyen. i Sanitariya (Moscow), no. 2, Feb. 1982 p 7-11 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

N82-30914# Joint Publications Research Service, Arlington, Va.
MAIN DIRECTIONS OF SOVIET RESEARCH ON BIOLOGICAL EFFECTS OF MICROWAVE RADIATION
M. G. Shandala, M. I. Rudnev, Ye. F. Stoyan, and G. I. Vinogradov *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 75-80 refs Transl. into ENGLISH from Gigiyen. i Sanitariya (Moscow), no. 10, Oct. 1981 p 4-7 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

N82-30915# Joint Publications Research Service, Arlington, Va.
CYTOGENETIC AND GONADOTOXIC EFFECTS OF STATIC ELECTRIC FIELDS
K. I. Stankevich, L. N. Badayeva, L. V. Samosh, and L. Z. Shumova *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 81-84 refs Transl. into ENGLISH from Gigiyen. i Sanitariya (Moscow), no. 10, Oct. 1981 p 9-11 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-30935# Joint Publications Research Service, Arlington, Va.
USSR REPORT. LIFE SCIENCES: BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 19
4 Aug. 1982 101 p refs Transl. into ENGLISH of various RUSSIAN articles
(JPRS-81442) Avail: Issuing Activity

Numerous topics in the biomedical and behavioral sciences are discussed. Bionics, biotechnology, ecology, medical demography, physiology, and radiation biology are among the topics covered. For individual titles, see N82-30936 through N82-30938.

N82-30936# Joint Publications Research Service, Arlington, Va.
NEW ASPECTS OF FUNCTIONAL SYSTEM THEORY
K. V. Sudakov *In its* USSR Rept. Life Sci.: (JPRS-81442) 4 Aug. 1982 p 59-73 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 2, Feb. 1982 p 3-13 (For primary document see N82-30935 21-53)
Avail: Issuing Activity

The psychology of human motivation is discussed. A functional system theory is examined which states that living beings are inscribed in the exogenous time and space continuum which can be separated into discrete quanta, each of which is formed by some need of the organism and leads to satisfaction of those needs. R.J.F.

N82-30937# Joint Publications Research Service, Arlington, Va.
PLASTIC PROPERTIES OF MOTIVATION AS PRIME COMPONENT IN SYSTEMIC ORGANIZATION OF PURPOSEFUL BEHAVIORAL ACTS
A. V. Kotov and V. G. Zilov *In its* USSR Rept. Life Sci.: (JPRS-81442) 4 Aug. 1982 p 74-80 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 2, Feb. 1982 p 17-21 (For primary document see N82-30935 21-53)
Avail: Issuing Activity

The nature of corticofugal influences on the formation in animals of food and defense motivations were studied. Inhibitory effects resulting from the stimulation of the frontal cortex were noted, as well as more complex influences resulting rom the simulation of the occipital region of the neocortex, namely the inhibition of avoidance reactions and alleviation of food behavior. R.J.F.

N82-30938# Joint Publications Research Service, Arlington, Va.
SYSTEMIC MECHANISMS OF HUMAN SUBCONSCIOUS ACTIVITY
Ye. A. Umryukhim *In its* USSR Rept. Life Sci.: (JPRS-81442)

4 Aug. 1982 p 81-90 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 2, Feb. 1982 p 88-95 (For primary document see N82-30935 21-53)
Avail: Issuing Activity

A model of the systemic organization of the subconscious mechanisms of human behavior is given with emphasis upon man's intuitive learning. The experimental data which served as the basis of the analysis was obtained by means of a technique which made it possible to single out and examine the stages of human learning. R.J.F.

N82-30939# Naval Training Analysis and Evaluation Group, Orlando, Fla.
IMPROVED PROCEDURES TRAINING THROUGH USE OF AIDS DEVELOPED FROM LEARNING GUIDELINES
Paul G. Scott, William C. McDaniel, and Richard Braby Feb. 1982 29 p refs
(AD-A113109; TAEG-TR-113) Avail: NTIS HC A03/MF A01 CSCL 05/9

This report describes the development of a procedural training aid for the SH-3 Aircraft Normal Start Checklist. The results of a comparative evaluation of the training aid with the traditional squadron materials used for procedures training are provided. Author (GRA)

N82-30940# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
PREDICTION OF SHORT TERM TRACKING TASKS USING AN OPTIMAL PILOT MODEL M.S. Thesis
Patrick A. Mullen Mar. 1982 101 p refs
(AD-A115543; AFIT/GAE/AA/81D-21) Avail: NTIS HC A06/MF A01 CSCL 17/8

An optimal pilot model has previously been successful in predicting the long term tracking performance of a longitudinal air-to-air gunnery task. This study investigated modifications to the same pilot model to determine whether it could be used to successfully predict performance for a short term task. The same task, including a lead computing optical sight, was simulated on a hybrid computer. Three pilots flew three different aircraft configurations on the fixed-base simulator against a target driven to RMS accelerations of 3.5G and 5.0G by filtered, Gaussian noise. The target was at either 1000' or 3000' range. A comparison of the data generated by the human pilots versus that of the optimal pilot model showed moderate correlation for elevator deflection, lead angle and pitch rate. Overall, the optimal pilot model was less successful in predicting short term tracking performance than it was in predicting long term performance. GRA

N82-30941# Naval Biodynamics Lab., New Orleans, La.
PERFORMANCE TESTS FOR REPEATED MEASURES: MORAN AND COMPUTER BATTERIES
Alvah C. Bittner, Jr., Robert C. Carter, and Michele Krause Nov. 1981 24 p refs
(AD-A115068; NBDL-81R012) Avail: NTIS HC A02/MF A01 CSCL 05/10

This investigation was directed at statistical baseline evaluation of nine tasks for suitability for repeated measures applications to environmental investigations. In the first study, tasks from Moran and Mefferd (1959) were administered to 18 subjects daily for 13 work days (Monday to Friday). In the second study, Carter and Sbisa (1981) computer battery tasks were administered daily to 17 subjects (12 in common with first study) for 15 work days. Examination of the means, variances, interday reliabilities and cross-task correlations led to the recommendation of four tasks for repeated measures applications Vertical Addition (Nv), Perceptual Speed (PS), Grammatical Reasoning (GR), and Flexibility of Closure (FC). Author (GRA)

N82-30839*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PURSUIT TRACKING AND HIGHER LEVELS OF SKILL DEVELOPMENT IN THE HUMAN PILOT
Ronald A. Hess *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 92-105 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05I

N82-30844*# Massachusetts Inst. of Tech., Cambridge.
SUBJECTIVE SCALING OF MENTAL WORKLOAD IN A MULTI-TASK ENVIRONMENT
Bahman Daryanian *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 172-188 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05I

N82-30845*# San Jose State Univ., Calif.
EFFECT OF COUNTING AND TRACKING ON VERBAL AND PRODUCTION METHODS OF TIME ESTIMATION
Kathleen L. Bird and Sandra Hart *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 199-211 refs Prepared in cooperation with Tufts Univ., Medford, Mass. (For primary document see N82-30833 21-51)
(Contract NCC2-34; Grant NsG-2156)
Avail: NTIS HC A99/MF A01 CSCL 05I

N82-30846*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
A MODEL BASED TECHNIQUE FOR PREDICTING PILOT OPINION RATINGS FOR LARGE COMMERCIAL TRANSPORTS
William H. Levison *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 216-242 refs (For primary document see N82-30833 21-51)
(Contract NAS1-15529)
Avail: NTIS HC A99/MF A01 CSCL 05I

N82-30847*# National Aerospace Lab., Tokyo (Japan). Instrumentation and Control Div.
AN ANALYTICAL PREDICTION OF PILOT RATINGS UTILIZING HUMAN PILOT MODEL
Keiji Tanaka and Kyuichiro Washizu *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 243-253 refs Prepared in cooperation with Tokyo Univ. (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05I

N82-30861*# Ohio State Univ., Columbus. Dept. of Industrial and Systems Engineering.
COMBINED DISCRETE NETWORK CONTINUOUS CONTROL MODELLING OF OPERATOR BEHAVIOR
R. A. Miller and Deborah J. Seifert (AiResearch Manufacturing Co.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 448-464 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05I

N82-30862*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.
A MODEL OF HUMAN DECISION MAKING IN MULTIPLE PROCESS MONITORING SITUATIONS
Joel S. Greenstein and William B. Rouse (Illinois Univ., Urbana-Champaign) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 465-487 refs (For primary document see N82-30833 21-51)
(Grant NsG-2119)
Avail: NTIS HC A99/MF A01 CSCL 05J

N82-30864*# Systems Research Labs., Inc., Dayton, Ohio.
APPLICATION OF OPTIMAL CONTROL PRINCIPLES TO DESCRIBE THE SUPERVISORY CONTROL BEHAVIOR OF AAA CREW MEMBERS
Chris Hale and George J. Valentino (Air Force Aerospace Medical Reseach Lab., Wright-Patterson AFB, Ohio) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 523-532 (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05J

N82-30908# Joint Publications Research Service, Arlington, Va.
CHROMATIN OF RAT BRAIN NEURONS AND NUCLEIC ACIDS OF MUSCLES AS RELATED TO LOCALIZATION OF DECIMETER WAVES DURING EXERCISE
Z. A. Sokolova *In its* USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 44-47 refs Transl. into ENGLISH from Vopr.

Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 35-38 (For primary document see N82-30899 21-51)
Avail: Issuing Activity

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-30942*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPACE TELESCOPE NEUTRAL BUOYANCY SIMULATIONS: THE FIRST TWO YEARS
Fred G. Sanders Jun. 1982 126 p
(NASA-TM-82485; NAS 1.15:82485) Avail: NTIS HC A07/MF A01 CSCL 05H

Neutral Buoyancy simulations which were conducted to validate the crew systems interface as it relates to space telescope on-orbit maintenance and contingency operations is discussed. The initial concept validation tests using low fidelity mockups is described. The entire spectrum of proposed space telescope refurbishment and selected contingencies using upgraded mockups which reflect flight hardware are reported. Findings which may be applicable to future efforts of a similar nature are presented. E.A.K.

N82-30943*# Martin Marietta Labs., Baltimore, Md.
ALGAL CULTURE STUDIES RELATED TO A CLOSED ECOLOGICAL LIFE SUPPORT SYSTEM (CELSS)
R. O. Radmer, O. Ollinger, A. Venables, and E. Fernandez Jul. 1982 37 p refs
(Contract NAS2-10969)
(NASA-CR-166375; NAS 1.26:166375) Avail: NTIS HC A03/MF A01 CSCL 06K

Studies with algal cultures which relate to closed ecological life support systems (CELSS) are discussed. A description of a constant cell density apparatus for continuous culture of algae is included. Excretion of algal by-products, and nitrogen utilization and excretion are discussed. Author

N82-30944*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FMP STUDY OF PILOT WORKLOAD. QUALIFICATION OF WORKLOAD VIA INSTRUMENT SCAN
J. R. Tolel (Harvard Univ.), M. Vivaudou, R. L. Harris, Sr., and A. Ephrath (Bell Labs., Piscataway) [1982] 6 p refs
(Contracts NCC1-23; NCC1-56)
(NASA-CR-169254; NAS 1.26:169254) Avail: NTIS HC A02/MF A01 CSCL 05H

Various methods of measuring a pilot's mental workload are discussed. Scanning the various flight instruments with good scan pattern and other verbal tasks during instrument landings is given special attention for measuring pilot workload. L.F.M.

N82-30945# Human Resources Research Organization, Alexandria, Va.
HUMAN FACTORS AND ROBOTICS: CURRENT STATUS AND FUTURE PROSPECTS
H. McIlvaine Parsons and Greg P. Kearsley Oct. 1981 26 p refs
(Contract DAAD05-81-M-C790)
(AD-A115042; HUMRRO-PP-6-81) Avail: NTIS HC A03/MF A01 CSCL 05/5

The purpose of this article is to introduce the human factors community to the field of robotics including current and future applications and needed areas of research. It also aims to explain to the robotics community why human factors engineering is important to this field. GRA

N82-30946# Human Engineering Labs., Aberdeen Proving Ground, Md.
A COMPARISON OF DISPLAY FORMATS FOR THE ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM Final Report
Frank J. Malkin, Jon J. Fallesen, and Harry J. Reed Apr. 1982 31 p refs
(AD-A115127; HEL-TM-9-82) Avail: NTIS HC A03/MF A01 CSCL 14/2

A comparison of two sets of display formats for the Electronic Master Monitor and Advisory Display System (EMMADS) was conducted to determine the effect display format has no performance. Performance measures included accuracy of response and latency of response to a display of a fault, as well as error on a subsidiary tracking task. A subjective questionnaire was used to determine if pilot preferences exist for display format. The results indicated that there were no significant differences in any performance measure due to the display formats but that there was a significant difference in reaction time among the subsystems. The subsystem with only three alternative faults had a significantly lower reaction time than the two other subsystems with eight and ten alternatives each. Pilot preference tended to favor those formats which were simple, uncluttered, and which appeared to be least busy. GRA

N82-30947# Sandia Labs., Albuquerque, N. Mex.
OVERVIEW OF A PROCEDURE FOR HUMAN-RELIABILITY ANALYSIS
B. J. Bell and A. D. Swain 1981 10 p refs Presented at the ANS/EBS Top. Meeting on Probabilistic Risk Assessment, Port Chester, N. Y., 20 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030816; SAND-81-1961C; CONF-810905-6) Avail: NTIS HC A02/MF A01

An overview of the procedure used in performing a human reliability risk assessment and reliability analysis for nuclear power plant personnel is given. DOE

N82-30834*# Illinois Univ., Chicago. Coll. of Engineering.
MODELLING OF HUMAN OPERATOR DYNAMICS IN SIMPLE MANUAL CONTROL UTILIZING TIME SERIES ANALYSIS
Gyan C. Agarwal, Frank Osafo-Charles, William D. Oneill, and Gerald L. Gottlieb *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 1-28 refs Prepared in cooperation with Rush-Presbyterian-Saint Luke's Medical Center, Chicago, Ill. (For primary document see N82-30833 21-51)
(Grants NSF ENG-76-08754; NS-00196; NS-12877)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30835*# Systems Research Labs., Inc., Dayton, Ohio.
A GUNNER MODEL FOR AN AAA TRACKING TASK WITH INTERRUPTED OBSERVATIONS
C. F. Yu, K. C. Wei, and M. M. Vikmanis (Aerospace Medical Research Lab.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 29-39 refs (For primary document see N82-30833 21-51)
(Contract F33615-79-C-0500)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30836*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
MODELING HUMAN TARGET ACQUISITION IN GROUND-TO-AIR WEAPON SYSTEMS
A. V. Phatak, R. L. Mohr, M. M. Vikmanis (Aerospace Medical Research Lab.), and K. C. Wei (Systems Research Lab., Dayton Ohio) *In* MIT Proc. of the 16th Ann. Con. on Manual Control 1980 p 40-48 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30837*# National Aerospace Lab., Amsterdam (Netherlands).
THE EFFECT OF VISUAL INFORMATION ON THE MANUAL APPROACH AND LANDING
P. H. Wewerinke *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 49-65 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30841*# Tokyo Univ. (Japan). Dept. of Aeronautics.
AN EXPERIMENTAL STUDY OF HUMAN PILOT'S SCAN-

NING BEHAVIOR
Kyuichiro Washizu, Keiji Tanaka (National Aerospace Lab., Tokyo), and Tatsuo Osawa *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 128-133 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30842*# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany). Dept. of Human Factors Engineering and Simulation.
PARAMETRIC IDENTIFICATION OF HUMAN OPERATOR MODELS
Norbert R. Ninz *In* MIT Proc. of the 16th Ann. Cong. on Manual Control 1980 p 137-145 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30843*# Georgia Inst. of Tech., Atlanta. Systems Engineering Lab.
A COMPUTER SIMULATION APPROACH TO MEASUREMENT OF HUMAN CONTROL STRATEGY
Joanne Green, Esther Lee Davenport, Harold F. Engler, and William E. Sears, III *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 146-171 refs (For primary document see N82-30833 21-51)
(Contract N00014-75-C-0432)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30853*# Systems Technology, Inc., Hawthorne, Calif.
A SOFTWARE PACKAGE FOR EVALUATING THE TRANSMISSIBILITY BETWEEN VEHICLE VIBRATION AND MOTIONS OF HANDS (IN CONTROLS), LIMB, HEAD AND EYES
Susan A. Riedel, Henry R. Jex, and Raymond E. Magdaleno *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 317-339 refs (For primary document see N82-30833 21-51)
(Contract F33615-79-C-0519)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30858*# Dayton Univ., Ohio. Dept. of Aerospace Engineering.
PILOT REACTION TO ATTITUDE GYRO FAILURE: A FLIGHT EXPERIMENT
Richard L. Newman and David L. Quam *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 410-421 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30863*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
PROCRU: A MODEL FOR ANALYZING FLIGHT CREW PROCEDURES IN APPROACH TO LANDING
S. Baron, G. Zacharias, R. Muralidharan, and R. Lancraft *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 488-520 refs (For primary document see N82-30833 21-51)
(Contract NAS2-10035)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30868*# Massachusetts Inst. of Tech., Cambridge.
A COMPARISON OF CONTROL MODES FOR TIME-DELAYED REMOTE MANIPULATION
Gregory P. Starr *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 584-592 refs (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30869*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Robotics and Teleoperator Group.
EXPERIMENTAL EVALUATION OF THE CONCEPT OF SUPERVISORY MANIPULATION
T. L. Brooks and T. B. Sheridan (MIT) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 593-606 refs (For primary document see N82-30833 21-51)
(Contracts NAS7-100; N00014-77-C-0256)
Avail: NTIS HC A99/MF A01 CSCL 05H

N82-30870*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
EVALUATION OF SMART SENSOR DISPLAYS FOR MULTIDIMENSIONAL PRECISION CONTROL OF SPACE SHUTTLE REMOTE MANIPULATOR
A. K. Bejczy, J. W. Brown (JPL, Calif. Inst. of Tech., Pasadena), and J. L. Lewis *In* MIT Proc. of 16th Ann. Conf. on Manual Control 1980 p 607-627 refs (For primary document see N82-30833 21-51)
(Contract NAS7-100)
Avail: NTIS HC A99/MF A01 CSCL 05H

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N82-30948*# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Electrical and Systems Engineering.
NASA PIONEER: VENUS REVERSE PLAYBACK TELEMETRY PROGRAM TR 78-2
J. W. Modestino, D. G. Daut, A. L. Vickers, and K. R. Matis Dec. 1978 114 p refs
(Contract NAS2-10006)
(NASA-CR-166363; NAS 1.26:166363) Avail: NTIS HC A06/MF A01 CSCL 09B

During the entry of the Pioneer Venus Atmospheric Probes into the Venus atmosphere, there were several events (RF blackout and data rate changes) which caused the ground receiving equipment to lose lock on the signal. This caused periods of data loss immediately following each one of these disturbing events which lasted until all the ground receiving units (receiver, subcarrier demodulator, symbol synchronizer, and sequential decoder) acquired lock once more. A scheme to recover these data by off-line data processing was implemented. This scheme consisted of receiving the S band signals from the probes with an open loop reciever (requiring no lock up on the signal) in parallel with the closed loop receivers of the real time receiving equipment, down converting the signals to baseband, and recording them on an analog recorder. The off-line processing consisted of playing the analog recording in the reverse direction (starting with the end of the tape) up, converting the signal to S-band, feeding the signal into the 'real time' receiving system and recording on digital tape, the soft decisions from the symbol synchronizer. S.L.

N82-30949*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CONSTRUCTION OF SOLUTIONS FOR SOME NONLINEAR TWO-POINT BOUNDARY VALUE PROBLEMS
James A. Pennline 1982 24 p refs Presented at the 30th Ann. Meeting of the Soc. for Ind. and Appl. Math., Stanford, Calif., 19-23 Jul. 1982
(NASA-TM-82937; E-1335; NAS 1.15:82937) Avail: NTIS HC A02/MF A01 CSCL 12A

Constructive existence and uniqueness results for boundary value problems associated with some simple special cases of the second order equation $y'' = f(x,y,y')$ $0 < \text{or} = x < \text{or} = 1$, are sought. The approach considered is to convert the differential equation and boundary conditions to an integral equation via Green's functions, and then to apply fixed point and contraction map principles to a sequence of successive approximations. The approach is tested on several applied problems. Difficulties in trying to prove general theorems are discussed. M.G.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering*.

N82-30950 Royal Signals and Radar Establishment, Malvern (England).

A DE-TRIGGERABLE ASTABLE CIRCUIT FOR MICROPROCESSOR RESET

C. G. Slingsby Jan. 1982 9 p

(RSRE-Memo-3447; BR82575) Copyright. Avail: NTIS HC A02/MF A01

An automatic system reset for microprocessors, which prevents lock-up and program cycle failure, is described. It uses a common integrated circuit timer. Negative pulses are fed through an inverter and are applied to a capacitor, which prevents the application of dc from a nonrunning program, causing detriggering and reset inhibition. The circuit depends on repeated program action to prevent reset, so software errors can initiate reset action. The system responds to incorrect microprocessor action arising from supply glitches too short to trigger normal reset circuits. Author (ESA)

N82-30951*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.

COMPONENT COST ANALYSIS OF LARGE SCALE SYSTEMS Final Report

Robert E. Skelton and Ajmal Yousuff 10 Jan. 1982 57 p refs

(Contract JPL-955369)

(NASA-CR-169210; JPL-9950-693; NAS 1.26:169210) Avail: NTIS HC A04/MF A01 CSCL 09B

The ideas of cost decomposition is summarized to aid in the determination of the relative cost (or 'price') of each component of a linear dynamic system using quadratic performance criteria. In addition to the insights into system behavior that are afforded by such a component cost analysis CCA, these CCA ideas naturally lead to a theory for cost-equivalent realizations. S.L.

N82-30952# Naval Postgraduate School, Monterey, Calif.

ADAPTATION OF MAGNETIC BUBBLE MEMORY IN A STANDARD MICROCOMPUTER ENVIRONMENT M.S. Thesis

Michael S. Hicklin and Jeffery A. Neufeld Dec. 1981 199 p refs

(AD-A115028) Avail: NTIS HC A09/MF A01 CSCL 09/2

Magnetic bubble memory is a new digital storage technology that offers many significant advantages over currently existing secondary storage media. Bubble memories, with high densities and relatively fast access times, are non-volatile semiconductor devices that provide a high degree of reliability in harsh environments. This technology has the potential for a vital and unique role in both the civilian and military computing environments due to the combination of characteristics exhibited by magnetic domain devices. This thesis presents an implementation of a magnetic bubble device utilizing a conventional operating system, Digital Research's CP/M-86, and a standard commercial 16-bit microcomputer, the Intel iSBC 86/2A. A fully operational system capable of testing, evaluating and utilizing a magnetic bubble device in a standard user environment is presented. Author (GRA)

N82-30953# Naval Training Equipment Center, Orlando, Fla. Computer Systems Lab.

COMPUTER ARCHITECTURE STUDY FOR VTXTS SIMULATORS Final Report, Mar. - Nov. 1981

Leonard D. Healy, Gerald A. Wyndle, and Bruce Baker (Servos and Simulation, Inc.) Apr. 1982 123 p refs

(AD-A115006; NAVTRAEQUIPC-IH-336) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report provides an evaluation of computer configurations that might be applied to VTXTS simulators. Computers ranging from the large, general purpose computer ordinarily used in data processing to the microcomputer which requires 40 separate units to implement a simulator complex are considered. Eleven computer configurations are evaluated with respect to availability, maintenance, expandability, risk and life cycle cost. The information is summarized in a table of advantages and disadvantages of the various configurations. Author (GRA)

N82-30954# Naval Training Equipment Center, Orlando, Fla. Computer Systems Lab.

DESIGN OF A MICROPROCESSOR-CONTROLLED LINKAGE FOR SIMULATOR APPLICATIONS Final Report, Oct. 1980 - Jun. 1981

Leonard D. Healy Apr. 1982 82 p

(AD-A115421; NAVTRAEQUIPC-IH-334) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report describes a method of linking a host computer to external devices and presents an implementation of such a system using multiple microcomputers. The technique used takes advantage of the statistical properties of simulator data to reduce the amount of data transferred, thereby insuring that those variables that change are updated with minimum delay. Implementation of linkage using multiple microcomputers provides a modular system easily tailored to various simulator applications. Author (GRA)

N82-30955# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

APPLICATION OF STATISTICAL ANALYSIS TECHNIQUES TO COMPUTER PERFORMANCE EVALUATION M.S. Thesis

Margaret A. Stover Dec. 1981 117 p refs

(AD-A115550; AFIT/GCS/EE/81D-17) Avail: NTIS HC A06/MF A01 CSCL 09/2

Multivariate statistical analysis techniques were examined to determine their applicability to computer performance evaluation. Specific techniques were multilinear regression, automatic interaction detection (AID), and ridge regression. A simulated data base created through a computer performance evaluation simulation developed at the Air force Institute of Technology was modeled using each technique. Multilinear regression derived the most accurate modeling equations, though no method adequately explained the variation in turnaround time. Ridge regression, designed to circumvent multicollinearity, also created modeling equations, but was less accurate because no multicollinearity was present in the system. AID, however, clustered the data into groups which explained high levels of the variability of the criterion variable within each group, and little between the groups. Data records which met the selection criteria for each group should also have values of the criterion variable within the range specified by that group. Although difficult to use, AID provided initial information about systems which could not be modeled through regression or other techniques. The applicability of each technique to selected types of computer systems was also documented. Author (GRA)

N82-30956# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A MANAGEMENT SYSTEM FOR COMPUTER PERFORMANCE EVALUATION M.S. Thesis

Harry K. Birch Dec. 1981 134 p refs

(AD-A115538; AFIT/GCS/EE/81D-1) Avail: NTIS HC A07/MF A01 CSCL 05/10

This study discusses the design and implementation of a management system that will provide an installation manager or manager of a computer system with the means to measure and evaluate the performance of their computer system. This system is composed of three parts; information, people, and reports. The information part of this system is a set of factors that can cause problems with computer performance and the data which can be gathered by various CPE tools and techniques used to solve these problems. The factors and data of the information portion of this management system are presented and discussed in this paper. The reports section of this system is the most important part because this is what the installation manager or computer system manager will use to determine the performance of their computer system. The responsibility of the reports and their accuracy lies with the CPE team. This paper discusses some of the reports that a CPE team can generate. GRA

N82-30957# National Academy of Sciences - National Research Council, Washington, D. C. Standing Panel to Survey International Developments in Computer Science.
INTERNATIONAL DEVELOPMENTS IN COMPUTER SCIENCE Technical Report, 15 Jan. - 15 Oct. 1981
F. E. Allen, J. T. Schwartz, I. L. Auerbach, E. Baark, and B. Berner 1 Jun. 1982 110 p refs
(Contract N00014-81-C-0274)
(AD-A115140; TR-001) Avail: NTIS HC A06/MF A01 CSCL 09/2

This is a survey of developments in computer science in five areas of the world outside the United States with principal emphasis on Japan. Most of the information was obtained from documents and other sources available in the United States. The one exception is the trip report of three authors who visited Japan in October 1981. Author (GRA)

N82-30958# Lincoln Lab., Mass. Inst. of Tech., Lexington.
THE PROGRAMMABLE MATCHED FILTER: A DESIGN STUDY
Anthony E. Filip, J. D. Drinan, A. H. Huntoon, J. D. Kurtze, and D. Malpass 1 Apr. 1982 87 p refs
(Contract F19628-80-C-0002; AF Proj. 4594)
(AD-A115026; TR-603; ESD-TR-82-005) Avail: NTIS HC A05/MF A01 CSCL 09/2

The Programmable Matched Filter was envisioned as a flexible approach toward real-time, multi-dimensional matched filtering problems. Its design features multiple, parallel arithmetic elements communicating with multiple memories via a crossbar switch at a clock rate of 16.7 MHz. The machine will sustain a throughput rate of more than 500 million real operations per second, or more than six Cray-1 computers. The extensive use of low-dissipation CMOS technology in large scale integrated circuits yields an estimated total of 5200 integrated circuits, dissipating less than one kilowatt, occupying 0.2 cubic meters and weighing approximately fifty kilograms. Author (GRA)

N82-30959# Wayne State Univ., Detroit, Mich. Dept. of Computer Science.
COMPUTERS AND THE FUTURE OF HUMAN CREATIVITY
Michael Conrad and M. A. Rahimi Jul. 1981 23 p refs
(Contract N00014-80-C-0365)
(AD-A115008; CSC-81-025) Avail: NTIS HC A02/MF A01 CSCL 05/8

The effects of computer science on human society can be usefully viewed in the framework of scale change. A number of examples of scale change are considered, in design, mathematics, social organization, medicine and, most especially, in the modeling and perception of the complex biological and social world in which we live. The common feature in these examples is the computer's ability to allow humans to return to modes of thought which are crucial for both the psychological and historical origins of scientific and engineering activities, but which were deemphasized in the classical scientific paradigm due to limitations on information processing. The explicit appreciation of the scale changing power of the computer has important implications for computer science education and for its role in fully releasing the creative possibilities in the human-computer relationship.
Author (GRA)

N82-30960# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Komponenten.
A COMPACT MICROCOMPUTER SYSTEM FOR THE DEVELOPMENT AND SIMULATION OF MICROPROCESSOR CONTROL CIRCUITS
Winfried Poetzsch Mar. 1981 155 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-81-34) Avail: NTIS HC A08/MF A01; DFVLR, Cologne DM 33,60

The design, construction, and operation of a microcomputer system is described. The system serves as a test control unit for various processes and equipment, the automated control circuits of which are under development. The system is based on a robust microprocessor which contains all the subsystems necessary for blocking out programs and circuits, used in the development of a digital control apparatus. The microcomputer system can also simply be used in place of a customized microprocessor control unit. Results of the development of microprocessor control circuits for a navigational receiver and for a two-frequency radar are presented, including pertinent circuit diagrams. Author (ESA)

N82-30961# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Theoretische Stroemungsmechanik.
A SURVEY OF THE NEW VECTOR COMPUTERS CRAY 1S OF CRAY RESEARCH, CYBER 205 OF CDC, AND THE PARALLEL COMPUTER DAP OF ICL: ARCHITECTURE AND PROGRAMMING
Wolfgang Gentzsch 18 Feb. 1982 50 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-82-02) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 14,80

Problems, with reference to algorithms and programming for vector as well as parallel computers, are discussed in a user oriented context. Recently developed supercomputers are considered and typical application examples are given in CRAY FORTRAN, CYBER 205 FORTRAN, and in distributed array processor (DAP) FORTRAN. Systems performance is compared. Addition of parts of two N by N arrays is treated. The influence of architecture on algorithms and programming language is demonstrated. Numerical analysis of magnetohydrodynamic differential equations by an explicit difference method is illustrated, showing very good results for all three systems. The outlook for supercomputer development is assessed. Author (ESA)

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-30962*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADVANCED RELIABILITY MODELING OF FAULT-TOLERANT COMPUTER-BASED SYSTEMS
Salvatore J. Bavuso May 1982 33 p refs
(NASA-TM-84501; NAS 1.15:84501) Avail: NTIS HC A03/MF A01 CSCL 09B

Two methodologies for the reliability assessment of fault tolerant digital computer based systems are discussed. The computer-aided reliability estimation 3 (CARE 3) and gate logic software simulation (GLOSS) are assessment technologies that were developed to mitigate a serious weakness in the design and evaluation process of ultrareliable digital systems. The weak link is based on the unavailability of a sufficiently powerful modeling technique for comparing the stochastic attributes of one system against others. Some of the more interesting attributes are reliability, system survival, safety, and mission success.

N82-30963*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROGRAMS FOR TRANSFERRING DATA BETWEEN A RELATIONAL DATA BASE AND A FINITE ELEMENT STRUCTURAL ANALYSIS PROGRAM
Sally C. Johnson Jun. 1982 39 p refs
(NASA-TM-84512) Avail: NTIS HC A03/MF A01 CSCL 09B

An interface system for passing data between a relational information management (RIM) data base complex and engineering analysis language (EAL), a finite element structural analysis program is documented. The interface system, implemented on a CDC Cyber computer, is composed of two FORTRAN programs called RIM2EAL and EAL2RIM. The RIM2EAL reads model definition data from RIM and creates a file of EAL commands to define the model. The EAL2RIM reads model definition and EAL generated analysis data from EAL's data library and stores these data dirctly in a RIM data base. These two interface programs and the format for the RIM data complex are described. S.L.

N82-30964*# Atsuko Computing International, Huntsville, Ala.
AVE-SESAME PROGRAM FOR THE REEDA SYSTEM Final Report

John S. Hickey 16 Nov. 1981 38 p
(Contract NAS8-33844)
(NASA-CR-162052; NAS 1.26:162052; ACI-111681-R1) Avail: NTIS HC A03/MF A01 CSCL 09B

The REEDA system software was modified and improved to process the AVE-SESAME severe storm data. A random access file system for the AVE storm data was designed, tested, and implemented. The AVE/SESAME software was modified to incorporate the random access file input and to interface with new graphics hardware/software now available on the REEDA system. Software was developed to graphically display the AVE/SESAME data in the convention normally used by severe storm researchers. Software was converted to AVE/SESAME software systems and interfaced with existing graphics hardware/software available on the REEDA System. Software documentation was provided for existing AVE/SESAME programs underlining functional flow charts and interacting questions. All AVE/SESAME data sets in random access format was processed to allow developed software to access the entire AVE/SESAME data base. The existing software was modified to allow for processing of different AVE/SESAME data set types including satellite surface and radar data. S.L.

N82-30965*# Virginia Univ., Charlottesville. Dept. of Applied Mathematics and Computer Science.
THE IMPLEMENTATION AND USE OF ADA ON DISTRIBUTED SYSTEMS WITH HIGH RELIABILITY REQUIREMENTS Semiannual Progress Report
John C. Knight and Paul F. Reynolds Aug. 1982 70 p refs
(Grant NAG1-260)
(NASA-CR-169255; NAS 1.26:169255; UVA/528213/AMCS82/101) Avail: NTIS HC A04/MF A01 CSCL 09B

The use and implementation of ADA in distributed environments in which the hardware components are assumed to be unreliable is investigated. The possibility that a distributed system can be programmed entirely in ADA so that the individual tasks of the system are unconcerned with which processor they are executing on, and that failures can occur in the underlying hardware is considered. The reduced cost of computer hardware and the advantages of distributed processing (for example, increased reliability through redundancy and greater flexibility) indicate that many aerospace computer systems can be distributed. The use of ADA and distributed systems is a good combination for aerospace embedded systems. S.L.

N82-30966*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
DISSPLA PLOTTING ROUTINES FOR THE G-189A EC/LS COMPUTER PROGRAM
C. D. Simpson Apr. 1982 12 p refs
(Contract NAS9-15800; JSC-18273)
(NASA-CR-167715; NAS 1.26:18273; LEMSCO-18051) Avail: NTIS HC A02/MF A01 CSCL 09B

Data from a G-189A execution is formatted and plotted. The plotting may be done at the time of execution of the program. DISSPLA plot packages are used. The user has the choice of FR80 or TEKTRONIX output. Author

N82-30967*# Technology, Inc., Houston, Tex. Life Sciences Div.
THE GRAPHICS AND DATA ACQUISITION SOFTWARE PACKAGE Special Report
William G. Crosier 1 Dec. 1981 77 p refs
(Contract NAS9-14880)
(NASA-CR-167705; NAS 1.26:14880) Avail: NTIS HC A05/MF A01 CSCL 09B

A software package was developed for use with micro and minicomputers, particularly the LSI-11/DPD-11 series. The package has a number of FORTRAN-callable subroutines which perform a variety of frequently needed tasks for biomedical applications. All routines are well documented, flexible, easy to use and modify, and require minimal programmer knowledge of peripheral hardware. The package is also economical of memory and CPU time. A single subroutine call can perform any one of the following functions: (1) plot an array of integer values from sampled A/D data, (2) plot an array of Y values versus an array of X values; (3) draw horizontal and/or vertical grid lines of selectable type; (4) annotate grid lines with user units; (5) get coordinates of user controlled crosshairs from the terminal for interactive graphics; (6) sample any analog channel with program selectable gain; (7) wait a specified time interval, and (8) perform random access I/O of one or more blocks of a sequential disk file. Several miscellaneous functions are also provided. S.L.

N82-30968 Royal Aircraft Establishment, Farnborough (England).
COMPUTER PROGRAM FOR SMITH CHART DESIGN OF MICROWAVE MATCHING NETWORKS USING INTERACTIVE GRAPHICS
D. R. Mullins and C. P. Easthan Dec. 1980 49 p refs
(RAE-TR-80143; RAE-Space-588; BR82873) Avail: NTIS HC A03/MF A01

A computer program which plots impedance data and transformations on a Smith chart display by performing analytic calculations simultaneously at several frequencies was developed. It can be used in the design of microwave matching networks, from specification of terminating impedances, to determination of microstrip mechanical dimensions. A broadband network which matches the output of an MRA1417-11 power transistor to 50 ohms is described. A variety of microwave transistor amplifier design problems show that the program is easier to use than conventional small signal analysis programs. Author (ESA)

N82-30969 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
LATEST RESULTS FROM THE PROCEDURE CALLING TEST, ACKERMAN'S FUNCTION
B. A. Wichmann Mar. 1982 41 p refs
(NPL-DITC-3/82; ISSN-0143-7348) Avail: NTIS HC A03/MF A01

Results from measurements on the procedure calling efficiency of languages which support recursion, using Ackerman's function, are presented. Results show that the VAX is better than the DEC-10, and the ICL 2900 better than the ICL 1900 at subroutine linkage. Software-designed machines, e.g., the P-code of UCSD PASCAL perform best. Results for the implementation language S3 on the ICL 2900 are superior, in space and instructions executed, to the B6700. Codings for BASIC and ADA are given, although the original ALGOL 60 coding can be used unchanged with most languages. Author (ESA)

N82-30970# Sierra Geophysics, Inc., Redmond, Wash.
DECON: FUNCTIONAL SPECIFICATIONS FOR COMPUTATION OF RELATIVE RECEIVER FUNCTIONS
G. M. Lundquist, G. R. Mellman, and D. M. Hadley Alexandria, Va. VELA Seismological Center 3 Sep. 1981 37 p refs
(Contract F08606-79-C-0009; ARPA Order 2551)
(AD-A110623; SGI-R-82-051; VSC-TR-81-25) Avail: NTIS HC A03/MF A01 CSCL 09/3

This document contains the functional specifications for a program to compute relative receiver functions by a deconvolution method. The program structure is discussed; and individual subroutines are named and their function is specified. Though not a working program, these functional specifications determine the orientation, flow and interaction of the software in detail which is exceeded only by the code itself. Author (GRA)

N82-30971# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
TOWARD ADA: THE CONTINUING DEVELOPMENT OF AN ADA COMPILER M.S. Thesis
Patrick R. Werner Dec. 1981 74 p refs
(AD-A115479; AFIT/GCS/MA/81D-7) Avail: NTIS HC A04/MF A01 CSCL 09/2

This thesis involved the continuing development of the AFIT-ADA compiler. Basic concepts of the compilation process were reviewed. The design and structure of the AFIT-ADA compiler were examined. Tests from the ADA Compiler Capability system were applied to the compiler. Sections of the compiler were rewritten in a more structured manner. This development was performed on the DEC-10 system of the Air Force Avionics Laboratory at Wright-Patterson AFB. Author (GRA)

N82-30972# Naval Postgraduate School, Monterey, Calif.
A MACRO APPROACH TO SOFTWARE RESOURCE

ESTIMATION AND LIFE CYCLE CONTROL M.S. Thesis
Blair Roland Vorgang Dec. 1981 145 p refs
(AD-A114520) Avail: NTIS HC A07/MF A01 CSCL 09/2

Planning and controlling the software development process has shown, in the past, to be an extremely difficult task. The estimation of resource requirements, development costs, risk profiles and project feasibility has often proven to be inaccurate, this costing the government time and dollars. However, by using obtainable management parameters, and simple engineering and operations research techniques, estimating can be done easily and accurately by taking a macro approach to the estimation problem. This study will present the background and mathematical basis for a software cost estimation model. In addition, an example of an automated application of the model will be presented and discussed. Author (GRA)

N82-30973# Naval Postgraduate School, Monterey, Calif.
EVALUATION OF SECNAVINST 3560.1 TACTICAL DIGITAL SYSTEMS DOCUMENTATION STANDARD FOR SOFTWARE MAINTENANCE Final Report, 1 Jan. 1980 - 1 Jan. 1982
Norman F. Schneidewind 22 Feb. 1982 30 p refs
(AD-A114501; NPS54-82-003) Avail: NTIS HC A03/MF A01 CSCL 09/2

Management and developers have given insufficient attention to software maintenance, the most expensive phase of the software life cycle. Standards have improved the ability to develop and design software, but most standards do not deal with the maintenance phase in a substantive way. SECNAVINST 3560.1, Tactical Digital Systems Documentation Standard for Software Maintenance, was evaluated with respect to its usability for software maintenance. Recommendations are made for improving the maintainability aspects of this instruction. Author (GRA)

N82-30974# Naval Postgraduate School, Monterey, Calif.
OVERVIEW OF RELATIONAL PROGRAMMING
Bruce J. MacLennan Nov. 1981 25 p refs
(RR0000110)
(AD-A114462; NPS52-81-017) Avail: NTIS HC A02/MF A01 CSCL 12/1

The method of programming in a relational calculus is reviewed. This is a style of programming in which entire relations are manipulated as data, and in which the program itself is represented as a relation. The use of the relational operators to manipulate both data and functions is discussed. An improved notation for relational programming is introduced. Author

N82-30975# Harvard Univ., Cambridge, Mass. Computation Lab.
O (LOG N) TIME RECOGNITION OF DETERMINISTIC CLFs
John H. Reif Apr. 1982 26 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A114923; TR-10-82) Avail: NTIS HC A03/MF A01 CSCL 05/7

We prove that the languages accepted by auxiliary deterministic pushdown machines with space s(n) greater than or equal to log n and time 2O(s(n)) are accepted in time O(s(n)) by parallel RAMs. Thus deterministic context free languages are accepted in time O (log n) and a polynomial number of processors by parallel RAMs. Also, we show that the languages accepted in time T(n) by parallel RAMs are accepted with simultaneous space T(n) and time 2O(T(n)2) by auxiliary deterministic pushdown machines. Author (GRA)

N82-30976# Systems Research Labs., Inc., Dayton, Ohio.
MANX: A SYSTEM FOR COMPUTERIZED CONTROL OF AND DATA ACQUISITION FROM BEHAVIORAL EXPERIMENTS Final Report, Aug. 1979 - Jun. 1980
Dennis W. Blick, J. Terry Yates, and Thomas G. Wheeler Mar. 1982 26 p refs
(Contract F33615-80-C-0603; AF Proj. 7757)
(AD-A114788; SAM-TR-82-6) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report is a general description of MANX, an integrated hardware/software system for the precise control and measurement of animal behavior. MANX and its State Programming Language facilitate optimal utilization of the NOVA laboratory computer for behavioral experiments. Author (GRA)

N82-30977# Honeywell, Inc., Bloomington, Minn. Corporate Computer Scienes Center.
CONCURRENT SYSTEM DESCRIPTION LANGUAGE Final Technical Report, 11 Sep. 1980 - 11 Sep. 1981
William T. Wood, Helmut K. Berg, Stone H. Yu, and William R. Paulsen Griffiss AFB, N.Y. RADC Feb. 1982 235 p refs
(Contract F30602-80-C-0295; AF Proj. 2529)
(AD-A115010; RADC-TR-82-3) Avail: NTIS HC A11/MF A01 CSCL 09/2

This report describes an effort to develop a concurrent system description language (CSDL). The development of the notation is based on studies of approaches to modeling, designing, decomposing, describing, analyzing, and deriving simulations of concurrent processing systems. The devised notation is based on a computational model which represents systems as a collection of communicating concurrent activities. CSDL takes an architectural approach viewing concurrency as a relationship among activities, rather than a concurrent programming approach viewing concurrency as a control construct. The model does not distinguish between hardware and software realizations. The notation integrates statements about the performance of concurrent processing systems. The basic principles of CSDL include data abstraction and refinement, hierarchies of abstract machines and their decomposition, representation of system requirements and design solutions for all system components. GRA

N82-30978# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
A PRIMER FOR THE ACT-1 LANGUAGE
Dan Theriault Apr. 1982 95 p refs
(Contracts N00014-80-C-0505; N00014-75-C-0522)
(AD-A115072; AIM-672) Avail: NTIS HC A05/MF A01 CSCL 09/2

This paper describes the current design for the ACT-I computer programming language, and describes the Actor computational model, which the language was designed to support. It provides a perspective from which to view the language, with respect to existing computer language systems and to the computer system and environment under development for support of the language. The language is informally introduced in a tutorial fashion and demonstrated through examples. A programming strategy for the language is described, further illustrating its use. Author (GRA)

N82-30979# Rome Air Development Center, Griffiss AFB, N.Y.
SOFTWARE DESIGN METHODOLOGIES: SOME MANAGEMENT PERSPECTIVES
William E. Rzepka Mar. 1982 50 p refs
(AF Proj. 5581)
(AD-A115441; RADC-TR-82-50) Avail: NTIS HC A03/MF A01 CSCL 09/2

The purpose of this report is to provide general information concerning software design methodologies to technical management personnel. In particular, the report is aimed at managers who are in the planning stages of a software development and are facing the decisions of whether to use a formal design methodology and which methodology to use. To accomplish this objective a definition of design methodology is presented, explained and illustrated. Major design philosophies are discussed and the kinds of applications which they address are described. Following this introductory information, various management perspectives on software design methodologies are presented. In general, these perspectives pertain to the current state of software design methodology development and support tools, as well as relevant application experiences. GRA

N82-30980# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ANALYSIS OF THE OPTIMUM RECEIVER DESIGN PROBLEM USING INTERACTIVE COMPUTER GRAPHICS M.S. Thesis
Michael Reno Mazzucchi Dec. 1981 210 p refs
(AD-A115498; AFIT/GE/EE/81D-39) Avail: NTIS HC A10/MF A01 CSCL 09/2

The purpose of this project was to design a tutorial aid for the study of signal detection theory and its application to communication receiver design. An interactive computer program

was developed to solve problems concerning the detection of amplitude and/or phase shift keyed signals in the presence of additive white gaussian noise. The probability of error criterion was used to compare and optimize signal set parameters. The user may input from 2 to 33 two-dimensional signal vectors ranging in amplitude from 10 to the -6th power to 10 to the 4th power units, specify signal probabilities, and system noise energy. The computed system and signal statistics include signal energy, signal-to-noise ratio, Union Bound on and integrated values of probability of error, noise power spectral density, and center of gravity. Graphical displays provide signal set with coordinates and decision region boundaries. Modifications to signal set may be performed via translation, rotation, or scaling, and deletion or addition of signals. The programming language used was FORTRAN 77 with graphical capability provided thru the Tektronix PLOT-10 graphics package. The program (less graphical capability) may be executed from any interactive terminal supported by the FORTRAN 77 compiler and the 'International Mathematical and Statistical Libraries' (IMSL) routines MDNOR and MDBNOR. For graphical displays, use of Tektronix terminals model 4014, 4012, or 4010 is required. Author (GRA)

N82-30981# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

CONTINUED DEVELOPMENT AND IMPLEMENTATION OF A STANDARD GRAPHICS PACKAGE FOR THE AFIT VAX 11/780 M.S. Thesis

Philip Boman Tarbell, III Dec. 1981 172 p refs
(AD-A115499; AFIT/GE/EE/81D-58) Avail: NTIS HC A08/MF A01 CSCL 09/2

Graphics packages that have been implemented based on the 1979 ACM/SIGGRAPH Core Standard Proposal were investigated. Two packages were identified that best met AFIT's needs, based on host processor implementation and availability. These two packages were GRAFCORE, from the Lawrence Livermore National Laboratory, and GWCORE, from The George Washington University. GRAFCORE was the package initially selected for installation on the AFIT VAX. GWCORE was also obtained, but not installed. Both packages currently provide output-only capability. Problems with GRAFCORE installation that had to be overcome included characters lost in transmission, incomplete files, and the need to manually convert some of the code from the LRLTRAN language used at Lawrence Livermore into standard FORTRAN. Future efforts in this area should begin with device driver design and implementation for both graphics packages, followed by implementation of graphics-input routines. Author (GRA)

N82-30982# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

MODIFY: A MACHINE-INDEPENDENT MAINTENANCE PROGRAM M.S. Thesis

Nancy Joan Murphy Dec. 1981 128 p refs
(AD-A115553; AFIT/GCS/MA/81D-5) Avail: NTIS HC A07/MF A01 CSCL 09/2

It is not uncommon for an organization to maintain a set of files on two or more different computer systems. Each system has its own way of allowing the user to make changes to the files, forcing users not only to know those unique procedures but to make duplicate changes for each system. Making the same changes to the same files on different computer systems requires additional time and increases the risk of making errors. This paper presents the procedures, considerations, and design decisions made, leading to the implementation of MODIFY, a machine-independent batch utility designed to assist programmers in maintaining source files. MODIFY, which is written in standard FORTRAN 77, handles routine update/retrieval functions and provides a complete audit trail of changes. Author (GRA)

N82-30983# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

CONTINUED DEVELOPMENT OF THE JOVIAL (J73) TO ADA TRANSLATOR SYSTEM M.S. Thesis

Eric L. East Dec. 1981 84 p refs
(AD-A115548; AFIT/GCS/MA/81D-2) Avail: NTIS HC A05/MF A01 CSCL 09/2

The Department of Defense recently announced ADA as the new standard high order programming language for embedded-computer software which will replace JOVIAL(J73), the current Air Force standard. Since the Air Force has a considerable investment in J73 software, there is a real need for a J73-to-ADA translator. The subject of this thesis is the continued development of this translator which was originally developed by Capt. Richard L. Brozovic (AFIT/GSC/EE/80D-5). Author (GRA)

N82-30984# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AN INTERMEDIATE LANGUAGE AND INTERPRETER FOR THE ASGOL GRAPHICS LANGUAGE M.S. Thesis

Kevin P. Albert Dec. 1981 138 p refs
(AD-A115546; AFIT/GCS/MA/81D-1) Avail: NTIS HC A07/MF A01 CSCL 09/2

In an effort to make ASGOL (ALGOL-Structured Graphics Oriented Language) more powerful, conditional and looping instructions were added to the language. To do this the existing interpreter system was converted to a compiler/interpreter system. An intermediate language was designed as the compiler output and thus the source language for the interpreter. Author (GRA)

N82-30985# Wayne State Univ., Detroit, Mich. Dept. of Computer Science.

EXAMPLE OF A SYSTEM WHICH IS COMPUTATION UNIVERSAL BUT NOT EFFECTIVELY PROGRAMMABLE

Michael Conrad and Otto Roessler (Tuebingen Univ.) Aug. 1981 8 p refs
(Contract N00014-80-C-0365)
(AD-A115009; CSC-81-023) Avail: NTIS HC A02/MF A01 CSCL 09/2

The incorporation of a chaotic component is a computing system is incompatible with its being effectively programmable. The example presented shows that the concepts of programming suitable for biological systems may differ from those which have grown out of our experience with present day digital computers. Author (GRA)

N82-30986# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Computer Information Systems.

SOFTWARE QUALITY METRICS: A SOFTWARE MANAGEMENT MONITORING METHOD FOR AIR FORCE LOGISTICS COMMAND IN ITS SOFTWARE QUALITY ASSURANCE PROGRAM FOR THE QUANTITATIVE ASSESSMENT OF THE SYSTEM DEVELOPMENT LIFE CYCLE UNDER CONFIGURATION MANAGEMENT M.S. Thesis

Stanley J. Jarzombek, Jr. Mar. 1982 327 p refs
(AD-A115501; AFIT/GCS/MA/82M-1) Avail: NTIS HC A15/MF A01 CSCL 09/2

Software Quality Assurance (SQA) is recognized as an essential function needed to monitor the software system development life cycle (SDLC). The framework established for Software Quality Metrics (SQM) provides goal-directed system specifications and the ability to quantitatively assess the quality of the system under development. The Automated Measurement Tool (AMT), which operationalizes the application of SQM, functions as the core of a Decision Support System, providing quantitative measures and various levels of reports. A literature survey of SQA aids enabled the recommendation of a minimum set of tools and techniques to be used by the SQA program for monitoring the SDLC, which has been envisioned as an iterative process controlled by management. Recognizing the functional impact of specific information as the key to objectively monitoring and controlling the software system development, the decision-making model was conceptualized as three subsystems within each phase of the SDLC: scanning (afferent), organizing (intelligence), and decision (efferent). The use of checklists by system developers highlights a prescriptive method of goal-directed development. The thesis provides justification for using SQM by reviewing the need and demonstrating how the concepts can now be used. Author (GRA)

N82-30987# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.

MAGNET PROGRAM [MAGNET - TEKNISK BESKRIVNING]

Ann Bengtson 1981 52 p refs In SWEDISH; ENGLISH summary

(TRITA-NA-8113) Avail: NTIS HC A04/MF A01

A program was developed for the interactive analysis of geomagnetic time series, consisting of hourly observations of the three components of the magnetic field at 129 different observatories in the world. The structure of the program, representation of commands, and decoding of commands and parameters are described. It is shown how correctness of input to the program is checked and how the information is organized. Building up of the data base is treated and representation of work areas and variables is reviewed. Author (ESA)

N82-30988# Pilz G.m.b.H. und Co., Esslingen (West Germany).
DEVELOPMENT OF A PROGRAMMING DEVICE FOR TRANSLATION INTO MACHINE READABLE FORM OF PROGRAMS FOR EPROMS Final Report, Nov. 1981
Hans-Axel Gielow Bonn Bundesministerium fuer Forschung und Technologie Dec. 1981 30 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-219; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6.30

Hardware and software engineering was undertaken in the development of a programming device. Microprocessor technology was applied in the search for a flexible means of programming random access programmable logic in an industrial environment. Efficient strategies were elaborated. Results indicate the successful introduction of this technology. Extension of the capabilities of the programming device as well as further application of microprocessor engineering are foreseen. Author (ESA)

N82-30989# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
HONEYWELL INFORMATION SYSTEMS COBOL CB4.1 (VALIDATION SUMMARY REPORT)
31 Oct. 1981 70 p
(PB82-155318; FCTC-81-111) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Honeywell Information Systems COBOL CB4.1 running under the SR4JS3-DPS1.3 operating system, provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the HIGH level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. Author (GRA)

62 COMPUTER SYSTEMS

Includes computer networks.

N82-30990# Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, Md.
GPSS AND MODELING OF COMPUTER COMMUNICATION NETWORKS
Charles B. Silio, Jr. and Kurt F. Schwarz Apr. 1982 103 p refs
(DA Proj. 1R7-65706-M-541)
(AD-A115012; AMSAA-TR-352) Avail: NTIS HC A06/MF A01 CSCL 09/2

The suitability of the language GPSS for discrete event simulation of computer communication networks is investigated. Capabilities and peculiarities of GPSS are examined, and sample simulation results for four ring network link level protocol models are presented. Translation of models from one dialect of GPSS to another is discussed, and certain inherent semantic differences are identified. GRA

N82-30991# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MODELING AND ANALYSIS OF A HYBRID COMPUTER NETWORK M.S. Thesis
Jack C. Gambill Dec. 1981 152 p refs
(AD-A115497; AFIT/GCS/EE/81D-7) Avail: NTIS HC A08/MF A01 CSCL 09/2

A hybrid computer network which dynamically changes switching techniques from packet switching to circuit switching depending upon path length, message length, traffic intensity, and number of channels is modeled and compared to the conventional switching techniques of circuit and packet switching. Initially, the circuit switching and packet switching models are constructed using Q-Gert and compared to determine which switching technique provides the smallest delays as the factors of message length, path length, traffic intensity, and number of channels are varied. The operation of hybrid switching network is defined and the network modeled using the results from comparing the circuit and packet switched models to determine when the hybrid network will be operating in the circuit switched or packet switched mode. The three models are compared to determine if the hybrid network as defined is feasible. The comparison clearly demonstrates the hybrid network consistently produces delays equal to the delays from circuit switching when it is the best and from packet switching when it is the best. Author (GRA)

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N82-30992*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AESOP: A COMPUTER-AIDED DESIGN PROGRAM FOR LINEAR MULTIVARIABLE CONTROL SYSTEMS
Bruce Lehtinen and Lucille C. Geyser 1982 7 p ref Presented at the Am. Control Conf., Arlington, Va., 14-16 Jun. 1982
(NASA-TM-82871; E-1246; NAS 1.15:82871) Avail: NTIS HC A02/MF A01 CSCL 09B

An interactive computer program (AESOP) which solves quadratic optimal control and is discussed. The program can also be used to perform system analysis calculations such as transient and frequency responses, controllability, observability, etc., in support of the control and filter design computations. M.G.

N82-30993# Yale Univ., New Haven, Conn. Dept. of Computer Science.
IN-DEPTH UNDERSTANDING. A COMPUTER MODEL OF INTEGRATED PROCESSING FOR NARRATIVE COMPREHENSION
Michael George Dyer May 1982 321 p refs
(Contract N00014-75-C-1111)
(AD-A114483; RR-219) Avail: NTIS HC A14/MF A01 CSCL 06/4

This dissertation describes a theory of memory representation, organization, and processing for in-depth understanding of complex narrative texts. Complicated texts require that different knowledge sources be represented, coordinated, instantiated, searched and applied. Such sources include: goals, plans, scripts, physical objects, settings, interpersonal implemented in BORIS, a computer program which reads and answers questions about narratives involving such topics as: divorce, legal disputes, personal favors, and service contracts. GRA

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-30994# Rome Air Development Center, Griffiss AFB, N.Y.
IMAGE RESTORATION BY THE METHOD OF PROJECTION ONTO CONVEX SETS, PART 1
Haywood E. Webb, D. C. Youla, and H. Stark Mar. 1982 41 p refs

(AF Proj. LD12)
(AD-A114733; RADC-TR-82-55-Pt-1) Avail: NTIS
HC A03/MF A01 CSCL 12/1

This report treats in the problem of iterative image restoration from projection operators in an infinite dimensional Hilbert Space. A priori information in the form that the solution lies in a convex subset of a closed linear manifold, is assumed. Theoretical and experimental results are included. Author (GRA)

N82-30995# School of Aerospace Medicine, Brooks AFB, Tex.
ON THE NONPROPAGATION OF ZERO SETS OF SOLUTIONS OF CERTAIN HOMOGENEOUS LINEAR PARTIAL DIFFERENTIAL EQUATIONS ACROSS NONCHARACTERISTIC HYPERPLANES Interim Technical Report
David K. Cohoon Dec. 1981 81 p refs
(AF Proj. 2312)
(AD-A114619; SAM-TR-81-40) Avail: NTIS
HC A05/MF A01 CSCL 12/1

In this paper nonuniqueness has been obtained for spaces smaller than the space of infinitely differentiable functions, which is an improvement of Cohen's nonuniqueness result. In the course of developing these results we made a study of some of the many function spaces lying between the space of infinitely differentiable functions and the space of real analytic functions. These are generalizations of the spaces studied by Gevrey, Friedman, and Hormander. Because the very definition of these spaces depends on the growth of derivatives, we include for completeness a proof of the formula for the nth derivative of the composition of two functions. GRA

N82-30996# Wisconsin Univ., Madison. Mathematics Research Center.
DISTRIBUTED BILINEAR SYSTEMS: POSITIVE AND NEGATIVE RESULTS ON CONTROLLABILITY Technical Summary Report
M. Slemrod Dec. 1981 7 p refs
(Contract DAAG29-80-C-0041; Grant AF-AFOSR-0172-81)
(AD-A114625; MRC-TSR-2310) Avail: NTIS
HC A02/MF A01 CSCL 12/1

Results on the problem of controlling bilinear distributed parameter systems are outlined. Results showing that one cannot control a bilinear distributed parameter system to a full open neighborhood of an infinite dimensional state space are given. A result which allows identification of an accessible set of states for a class of hyperbolic control systems is presented. Author

N82-30997# Wisconsin Univ., Madison. Mathematics Research Center.
STRUCTURE OF THE SET OF STEADY-STATE SOLUTIONS AND ASYMPTOTIC BEHAVIOR OF SEMILINEAR HEAT EQUATIONS Summary Report
P. L. Lions Dec. 1981 22 p refs
(Contract DAAG29-80-C-0041)
(AD-A114624; MRC-TSR 2306) Avail: NTIS
HC A02/MF A01 CSCL 12/1

A precise geometrical description of the set of steady state solutions for general classes of semilinear heat equations is given. Global results about the asymptotic behavior of the solutions of the initial value problem are proven. Author

N82-30998# Wisconsin Univ., Madison. Mathematics Research Center.
FINITE DATA LATTICE ALGORITHMS FOR INSTRUMENTAL VARIABLE RECURSIONS
Victor Solo (Harvard Univ., Cambridge, Mass.) Mar. 1982 28 p refs
(Contract DAAG29-80-C-0041)
(AD-A114598; MRC-TSR-2347) Avail: NTIS
HC A03/MF A01 CSCL 12/1

The last few years have seen a rapid development of the so-called Lattice Algorithms for the fast solution of finite data least squares problems. While a fast algorithm has been given for finite data Instrumental Variable Recursions, as yet no finite data lattice schemes have been given. In this work a lattice algorithm is derived for a finite data Instrumental Variable Recursion and its use in both ARMA and ARMAX Time Series models is indicated. Author (GRA)

N82-30999# Wisconsin Univ., Madison. Mathematics Research Center.
DIFFERENCE METHODS FOR PARABOLIC HISTORY VALUE PROBLEMS
Peter Markowich (Texas Univ. at Austin) Mar. 1982 29 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A114597; MRC-TSR-2346) Avail: NTIS
HC A03/MF A01 CSCL 12/1

This paper is concerned with one-step difference methods for parabolic history value problems in one space variable. These problems, which have the feature that the evolution of the solution is influenced by 'all its past' occur in the theory of viscoelastic liquids (materials with 'memory'). The history dependence is represented by a Volterra-integral in the equation of motion. Using recently obtained existence results and smoothness assumptions on the solution, we derive a local stability and convergence result for a Crank-Nicolson-type difference scheme by interpreting the linearized scheme as perturbation of a strictly parabolic scheme without memory term. Second order convergence is shown on sufficiently small time intervals. The presented approach carries over to other one-step difference methods like implicit Euler schemes. GRA

N82-31000# Wisconsin Univ., Madison. Mathematics Research Center.
ON THE EXISTENCE OF A FREE BOUNDARY FOR A CLASS OF REACTION-DIFFUSION SYSTEMS
J. Ildefonso Diaz (Universidad de Santander) and Jesus Hernandez (Universidad Autonoma de Madrid) Feb. 1982 32 p refs
(Contract DAAG29-80-C-0041)
(AD-A114577; MRC-TSR-2330) Avail: NTIS
HC A03/MF A01 CSCL 12/1

Some nonlinear stationary reaction-diffusion systems involving nonlinear terms which may be discontinuous are considered. Such systems occur, for instance, in the study of chemical reactions and the discontinuities correspond to reactions of order zero. In such concrete model, the set where the reactant vanishes plays an important role. Here we prove the existence of solutions for a general class of such systems satisfying Dirichlet or nonlinear boundary conditions. Necessary and sufficient conditions are given assuring that the reactant component vanishes on a set of positive measure. Estimates on the location of such set are given.
Author (GRA)

N82-31001# Wisconsin Univ., Madison. Mathematics Research Center.
ON REGULAR GENERALIZED LINE GRAPH DESIGNS
Ching-Shui Cheng (California Univ., Berkeley) and Gregory M. Constantine (Indiana Univ., Bloomington) Feb. 1982 22 p refs
(Contract DAAG29-80-C-0041; Grants NSF MCS-79-09502; NSF MCS-81-01727)
(AD-A114576; MRC-TSR-2331) Avail: NTIS
HC A02/MF A01 CSCL 12/1

A class of efficient designs called regular generalized line graph designs are introduced. This class of designs includes many well-known optimum and efficient designs, e.g., balanced incomplete block designs, group-divisible designs with lambda 2 equal lambda 1 + 1, group-divisible designs with lambda 1 equal lambda 2 + 1 and group size two, triangular designs with lambda 2 equal lambda 1 + 1, L2 designs with lambda 2 equal lambda 1 + 1, etc. The optimality of regular generalized line graph designs is investigated. This uses graph theory as a tool and unifies much of the previous work in the area.
Author (GRA)

N82-31002# Wisconsin Univ., Madison. Mathematics Research Center.
ON CONJECTURE OF C. A. MICCHELLI CONCERNING CUBIC SPLINE INTERPOLATION AT A BIINFINITE KNOT SEQUENCE
Rong-ging Jia Feb. 1982 14 p refs
(Contract DAAG29-80-C-0041)
(AD-A114552; MRC-TSR-2334) Avail: NTIS
HC A02/MF A01 CSCL 12/1

Cubic spline interpolations provides a good and handy method to approximate a given function or to fit a given set of points.

However, such an interpolation process does not always converge. It is known that the local mesh ratio (that of the lengths of two consecutive intervals) is less than 3 + sq. root/2, the interpolation process works for any given bounded data. This paper continues such investigation. It is shown that the above restriction on the knots maybe relaxed. Thus, for a wider class of knot sequences, the cubic spline interpolation can be still applied. Hopefully, this would make such interpolation process more feasible in pracrice. GRA

N82-31003# Wisconsin Univ., Madison. Mathematics Research Center.

CHOICE OF RESPONSE SURFACE DESIGN AND ALPHABETIC OPTIMALITY

George E. P. Box Feb. 1982 53 p refs
(Contract DAAG29-80-C-0041)
(AD-A114550; MRC-TSR-2333) Avail: NTIS
HC A04/MF A01 CSCL 12/1

It is argued that the specification of problem of experimental design (and in particular, of response surface design) should depend on scientific context. The specification for a widely developed theory of 'alphabetic optimality' for response surface applications is analyzed and found to be unduly limiting. Ways in which designs might be chosen to satisfy a set of criteria of greater scientific relevance are suggested. Detailed consideration is given to regions of operability and interest, to the design information function, to sensitivity of criteria to size and shape of the region, and to the effect of bias. Problems are discussed of checking for lack of fit, sequential assembly, orthogonal blocking, estimation of error, estimation of transformations, robustness to bad values, using minimum numbers of points, and employing simple data patterns. GRA

N82-31004# Wisconsin Univ., Madison. Mathematics Research Center.

CLASSICAL SOLUTIONS OF THE KORTEWEG-DEVRIES EQUATION FOR NON-SMOOTH INITIAL DATA VIA INVERSE SCATTERING

Robert L. Sachs Nov. 1981 59 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A114503; MRC-TSR-2308) Avail: NTIS
HC A04/MF A01 CSCL 12/1

The Cauchy problem for the Korteweg-deVries equation (KdV for short) q sub t (x,t) + q sub xxx (x,t) - 6q(x,t)q sub x(x,t) equal 0 q(x,0) equal Q(x) is solved classically for t greater than 0 via the so-called 'inverse scattering method'. This approach, originating with Gardner, Greene, Kruskal, and Miura 9, relates the KdV equation to the one-dimensional Schrodinger equation; -f'(x,k) + u(x)f(x,k) equal k superscript 2 f(x,k). By considering the effect on the scattering data associated to the Schrodinger equation (**) when the potential u(x) evolves in t according to the KdV equation (*), one obtains a linear evolution equation for the scattering data. The inverse scattering method of solving (*) consists of calculating the scattering data for the initial value Q(x). letting it evolve to time t, and then recovering q(x,t) from the evolved scattering data. Recently, P. Deift and E. Trubowitz 7 presented a new method for solving the inverse scattering problem (obtaining the potential from its scattering data). Our solution of the KdV initial value problem uses this approach to construct a classical solution. GRA

N82-31005# Wisconsin Univ., Madison. Mathematics Research Center.

MAXIMAL MONOTONICITY AND BIFURCATION THE CONTINUOUS SPECTRUM Technical Summary Report

Tassilo Kuepper and Juegen Weyer (Univ. de Santiago de Chile) Nov. 1981 21 p refs
(Contract DAAG29-80-C-0041)
(AD-A114493; MRC-TSR-2303) Avail: NTIS
HC A02/MF A01 CSCL 12/1

Consider a class of nonlinear eigenvalue problems of the form where T is a closed operator and where omega and F are nonlinear gradient operators satisfying omega (0) equal F(0) equal O, and thus u approximately 0 is a solution for all values of lambda. The equation is studied with particular emphasis to bifurcation from the trivial line of solutions, including bifurcation from the continuous spectrum of the linearized problem. For the special case that omega equal identity (i.e. T* omega T is positive selfadjoint) it has recently been shown that the lowest point of the spectrum of the linearized problem is a bifurcation point under suitable conditions on F. The proof makes extensive use of the decomposition of positive selfadjoint operators. In this paper we show that these results carry over to the nonlinear case, provided that omega is maximal cyclically monotone. The results are illustrated by nonlinear ordinary differential equations on unbounded intervals where the linearized problem has a purely continuous spectrum. Due to the general form of the leading part nonlinearities in the highest occurring derivatives are permitted. Author (GRA)

N82-31006# Wisconsin Univ., Madison. Mathematics Research Center.

CONVEX SOLUTIONS TO NONLINEAR ELLIPTIC AND PARABOLIC BOUNDARY VALUE PROBLEMS

Nicholas J. Korevaar Dec. 1981 25 p refs Sponsored in part by NSF
(Contract DAAG29-80-C-0041)
(AD-A114485; MRC-TSR-2307) Avail: NTIS
HC A02/MF A01 CSCL 12/1

This paper contains: (a) A proof that a function on a convex domain whose graph makes zero contact angle with the bounding cylinder and which satisfies an elliptic equation of the appropriate type is convex. (b) A generalization and direct proof of the Brascamp-Lieb result that the first eigenfunction of the Laplacian on a convex domain is Log concave (and so has covex level sets). GRA

N82-31007# Wisconsin Univ., Madison. Mathematics Research Center.

B-SPLINES FROM PARALLELEPIPEDS Technical Summary Report

C. deBoor and K. Hoellig Feb. 1982 24 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A114479; MRC-TSR-2320) Avail: NTIS
HC A02/MF A01 CSCL 12/1

Local support bases for piecewise polynomial spaces are important for applications such as finite element methods, data fitting etc. In (BH sub 1) a general construction principle for such B-splines was described. A special case are the so called box-splines. They have a particularly regular discontinuity pattern and coincide in special cases with standard finite elements. It is hoped that using translates of box-splines will lead, at least in two variables, to a unified theory for piecewise polynomial functions on regular meshes. This note is a first attempt in this direction and deals with basic approximation properties of translates of one box-splines such as stability, degree of approximation etc. Author (GRA)

N82-31008# Wisconsin Univ., Madison. Mathematics Research Center.

CUBIC LACK OF FIT FOR THREE-LEVEL SECOND ORDER RESPONSE SURFACE DESIGNS Technical Summary Report

N. R. Draper Jan. 1982 12 p refs
(Contracts DAAG29-80-C-0041; DAAG29-80-C-0113)
(AD-A114476; MRC-TSR-2323) Avail: NTIS
HC A02/MF A01 CSCL 12/1

A recent paper by Box and Draper (1982) discussed the detection of cubic lack of fit in second order composite design experiments, and its possible removal by the use of power transformations in the predictor variables. The designs examined were five level designs whose coded predictor variables could assume levels (-alpha, -1, 0, 1, alpha) for alpha not equal 1 (and, typically, alpha equal 1). When alpha equal 1, only three levels exist in the design and certain singularities occur. Cubic interaction contrasts exist, but it becomes impossible to estimate the power transformations, as previously when alpha not equal 1. This note describes how this happens. Author (GRA)

N82-31009# Wisconsin Univ., Madison. Mathematics Research Center.

A NEW APPROACH TO EULER SPLINE 2 Technical Summary Report

I. J. Schoenberg Dec. 1981 12 p refs
(Contract DAAG29-80-C-0041)
(AD-A114472; MRC-TR-2313) Avail: NTIS

HC A02/MF A01 CSCL 12/1

In a previous paper on the subject, the new recursive approach to the exponential Euler splines was used to derive the known properties and some new ones, of these most attractive among cardinal splines. In the present short note, written for Euler's bicentennial of 1983, we show that the new recursive construction leads precisely to the exponential Euler splines. GRA

N82-31010# Naval Research Lab., Washington, D. C.
THE USE OF FINITE J SUB THETA FOR INCREASING THE ION EFFICIENCY OF HIGH IMPEDANCE DIODES Interim Report
Robert J. Barker and Shyke A. Goldstein 12 Apr. 1982 45 p refs Prepared in cooperation with JAYCOR Inc., Alexandria, Va. Sponsored in part by Defense Nuclear Agency and DOE
(AD-A114983; NRL-MR-4773) Avail: NTIS HC A03/MF A01 CSCL 12/1

Numerical simulations predict that the ratio of the effective ion current to total diode current can be significantly increased by introducing a small but finite azimuthal current into the tip of the cathode shank of a high impedance (4 omega) axial pinch-reflex diode. Such a current generates large tangential magnetic fields along the electron-emitting cathode surfaces. These fields, in turn, impart a finite angular momentum to the electrons as they are injected into the anode-cathode gap. The resultant particle self-fields alter electron trajectories in such a way as to boost electron space charge near certain portions of the ion-emitting anode surface. The net consequence is a modification of the radial profile of ion emission which enhances the net ion current transmitted through the interior of the hollow cathode shank. Author (GRA)

N82-31011# Boston Coll., Chestnut Hill, Mass. Space Data Analysis Lab.
NUMERICAL AND DATA ANALYSIS TECHNIQUES APPLIED TO SCIENTIFIC RESEARCH, 4 Final Report, 1 Jan. 1979 - 31 Mar. 1981
Neil J. Grossbard, Marvin E. Stick, and Brian F. Sullivan 31 Aug. 1981 65 p refs
(Contract F19628-79-C-0063; AF Proj. 9993)
(AD-A115193; BC-SDAL-81-5; AFGL-TR-81-0329) Avail: NTIS HC A04/MF A01 CSCL 12/1

This report describes the mathematical and numerical analysis techniques used in the solution of four of the major problem efforts. Although many other problems were solved under this contract, the analysis and techniques utilized were for the most part similar with variations to those described in the three previous reports (AFCRL-TR-73-0433, AFGL-TR-76-0091, and AFGL-TR-79-0132). GRA

N82-31012# California Univ., Davis. Signal and Image Processing Lab.
A CLASS OF FFT BASED ALGORITHMS FOR LINEAR ESTIMATION
Anil K. Jain and Joachim Jasiulek Apr. 1982 77 p refs
(Grant DAAG29-78-G-0206)
(AD-A115161; SIPL-81-5) Avail: NTIS HC A05/MF A01 CSCL 12/1

In the past two decades since the advent of Kalman's recursive filter, numerous algorithms for linear estimation have emerged. Most of these algorithms are recursive and rely on solving a Riccati equation or equivalent recursive equations. It will be shown how some of the classical problems such as Linear Smoothing and Recursive Block Filtering problems can be solved exactly by some new nonrecursive algorithms which are based on the Fast Fourier Transform (FFT). Moreover, these algorithms are readily modified to generate the Riccati matrix at specified times, if this is desired. These results are then extended to a block filtering algorithm, where data is received and smoothed recursively block by block. Real time batch processing applications include image processing and array processing of signals. GRA

N82-31013# Florida State Univ., Tallahassee. Dept. of Statistics.
THE RELIABILITY OF k OUT OF n SYSTEMS
Philip J. Boland and Frank Proschan Mar. 1982 13 p refs Prepared in cooperation with Univ. Coll., Dublin, Ireland
(Contract F49620-82-K-0007; AF Proj. 2304)
(AD-A115280; FSU-STATISTICS-M610; TR-82-136; AFOSR-82-0453TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

A system with n independent components which function if and only if at least k of the components function is a k out of n system. Parallel systems are 1 out of n systems and series systems are n our of n systems. If p = (P sub 1, ..., P sub n) is the vector of component reliabilities for the n components, then h sub k (p) is the reliability function of the system. GRA

N82-31014# Brown Univ., Providence, R. I. Center for Dynamical Systems.
CONTROL OF DYNAMICAL SYSTEMS Annual Progress Report, 1 Sep. 1980 - 31 Aug. 1981
H. T. Banks, J. K. Hale, and E. F. Infante 31 Aug. 1981 20 p refs
(Grant AF-AFOSR-3092-76; AF Proj. 2304)
(AD-A115287; AFOSR-82-0456TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Research is reported on approximation techniques to be employed in parameter identification and optimal control problems. A general theoretical framework for such approximation schemes for partial differential equations was developed and tested numerically for the specific case of modal approximations. Significant advances were made in the difficult problems of parameter estimation for delay systems. Results for both semi-discrete and fully discrete methods for linear equations were obtained. Publications include: a book on Methods of Bifurcation Theory by Chow and Hale. An extensive paper on dynamical systems in infinitw dimensional spaces with the basic model being functional differential equations and parabolic partial differential equations; a paper on gradient-like delay equations discussing in detail the maximal compact invariant set; a rather complete discription of the flows defined by singularly perturbed delay differential equations. Abstracts of the papers resulting from the support of the grant are included in this annual report, as well as a list of papers produced during this period. GRA

N82-31015# Stanford Univ., Calif. Dept. of Statistics.
A LINEAR THEORY FOR NONCAUSALITY
J. P. Florens and M. Mouchart Nov. 1981 38 p refs
(Contract N00014-75-C-0442; NR Proj. 042-034)
(AD-A115302; TR-51) Avail: NTIS HC A03/MF A01 CSCL 12/1

Different definitions of noncausality (according to Granger, Sims, Haugh and Pierce....) are analyzed in terms of orthogonality in the Hilbert space of square integrable variables. Conditions, when necessary, are given for their respective equivalence. Some problems of testability are mentioned. Finally noncausality is also analyzed in terms of rational expectations, extending previous results of Sims. Author (GRA)

N82-31016# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A MONTE CARLO TECHNIQUE USING LINEAR INTERPOLATION TO GENERATE MODIFIED KOLMOGOROV-SMIRNOV CRITICAL VALUES FOR THE EXTREME VALUE DISTRIBUTION M.S. Thesis
Douglas R. Rogers Dec. 1981 116 p refs
(AD-A115544; AFIT/GOR/MA/81D-11) Avail: NTIS HC A06/MF A01 CSCL 12/1

An investigation was conducted to examine the merits of an estimation technique involving linear interpolation to estimate Kolmogorov-Smirnov (K-S) critical values when the scale and location parameters of the hypothesized distribution are unknown. The purpose of the linear estimation technique is to reduce the number of Monte Carlo generated samples necessary to produce useful critical values for the K-S goodness-of-fit test. Also, different plotting positions were studied to ascertain which plotting positions used in calculating and plotting the K-S test statistic values provided the best critical value estimation. In addition, a power study was performed which compared the power of the true critical values against the power of the estimated critical values. Useful critical values were found with the linear estimation technique using relatively few Monte Carlo generated samples. Further, the plotting positions found to be the best in calculating the K-S text statistic values and plotting these values were

respectively i/n and (i-.5)/n where i is the ith ranked point in a sample of size n. GRA

N82-31017# Osaka Univ. (Japan). Dept. of Precision Engineering.
DECOMPOSITIONS OF MULTIATTRIBUTE UTILITY FUNCTIONS BASED ON CONVEX DEPENDENCE
Hiroyuki Tamura and Yutaka Nakamura (California Univ., Davis) Mar. 1982 34 p refs
(Contract N00014-80-C-0897; NR Proj. 277-258)
(AD-A115048; WP-82-1) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper describes a method of assessing multiattribute utility functions. Introduced is the concept of convex dependence, which considers the change of shapes of conditional utility functions. Then, theorems which show how to decompose multiattribute utility functions using convex dependence are established. The convex decompositionincludes as special cases Keeney's additive/multiplicative decompositions, Fishburn's bilateral decomposition, and Bell's decomposition under the interpolation independence. Moreover, the convex decomposition is an exact grid model which was axiomatized by Fishburn and Farquhar. GRA

N82-31018# Stanford Univ., Calif. Dept. of Statistics.
RANDOM COVERING AND PACKING ON THE LINE
Howard J. Weiner 16 Feb. 1982 35 p refs
(Contract N00014-76-C-0475; NR Proj. 042-267)
(AD-A115392; SU-TR-314) Avail: NTIS HC A03/MF A01 CSCL 12/1

The asymptotic expected mean of the minimum number of randomly, uniformly placed unit intervals needed to cover (0,x) is obtained for the models of Renyi and Solomon. Asymptotic variances are indicated, and other models are given. The mean number of unit length intervals which may pack or cover a one-dimensional abacus grid is given. GRA

N82-31019# Stanford Univ., Calif. Dept. of Statistics.
A NOTE ON NON-LINEAR FUNCTIONS OF LINEAR COMBINATIONS
Persi Diaconis and Mehrdad Shashahani 2 Feb. 1982 20 p refs
(Contract N00014-76-C-0475; NR Proj. 042-267)
(AD-A115347; SU-TR-313) Avail: NTIS HC A02/MF A01 CSCL 12/1

Projection pursuit algorithms approximate a function of p variables by a sum of non-linear functions of linear combinations. We develop some approximation theory, give a necessary and sufficient condition for equality in (1), and discuss non-uniqueness of the representation. Author (GRA)

N82-31020# Yale Univ., New Haven, Conn. Dept. of Computer Science.
THE ORDER OF MONOTONE PIECEWISE CUBIC INTERPOLATION
S. C. Eisenstat, K. R. Jackson (Toronto Univ.), and J. W. Lewis (GE) 2 Aug. 1981 52 p
(Contract N00014-76-C-0277)
(AD-A115405; TR-207) Avail: NTIS HC A04/MF A01 CSCL 12/1

Fritsch and Carlson developed an algorithm which produces a monotone C1 piecewise cubic interpolant to a monotone function. We show that the algorithm yields a third-order approximation, while a modification is fourth-order accurate. Author (GRA)

N82-31021# Yale Univ., New Haven, Conn. Dept. of Computer Science.
ITERATIVE SOLUTION OF INDEFINITE SYMMETRIC SYSTEMS BY METHODS USING ORTHOGONAL POLYNOMIALS OVER TWO DISJOINT INTERVALS
Y. Saad 12 Oct. 1981 53 p refs
(Contract N00014-76-C-0277)
(AD-A115406; TR-212) Avail: NTIS HC A04/MF A01 CSCL 12/1

It is shown in this paper that certain orthogonal polynomials over two disjoint intervals can be particularly useful for solving large symmetric indefinite linear systems or for finding a few interior eigenvalues of a large symmetric matrix. There are several advantages of the proposed approach over the techniques which are based upon the polynomials having the least uniform norm in two intervals. While a theoretical comparison will show that the norms of the minimal polynomial of degree n in the least squares sense differs from the minimax polynomial of the same degree by a factor not exceeding 2(n+1)to the 0.5 power, the least squares polynomials are by far easier to compute and to use thanks to their three term recurrence relation. A number of suggestions will be made for the problem of estimating the optimal parameters and several numerical experiments will be reported. Author (GRA)

N82-31022# Yale Univ., New Haven, Conn. Dept. of Computer Science.
ALTERNATING-DIRECTION INCOMPLETE FACTORIZATIONS
Tony F. Chan, Kenneth R. Jackson (Toronto Univ.), and Benren Zhu (Shandong Univ.) 19 Aug. 1981 48 p refs Prepared in cooperation with Florida State Univ., Tallahassee
(Contracts N00014-76-C-0277; N00014-80-C-0076; Grant AF-AFOSR-0193-81)
(AD-A115430; TR-208) Avail: NTIS HC A03/MF A01 CSCL 12/1

To solve the system of linear equations Aw = r that arises from the discretization of a two-dimensional self-adjoint elliptic differential equation, iterative methods employing easily computed incomplete factorization, LU = A+B, are frequently used. Dupont, Kendall, and Rachford showed that, for the DKR factorization, the number of iterations (arithmetic operations) required to reduce the A-norm of the error by a factor of epsilon is O(h to the minus 1/2 power log 1 epsilon) (O(h to the minus 2 and 1/2 power log 1 epsilon)), where h is the stepsize used in the discretization. We present some error estimates which suggest that, if a pair of Alternating-Direction DKR Factorizations are used, then the number of iterations (arithmetic operations) may be decreased to O(h to the minus 1/3 power log 1 epsilon) (O(h to the minus 2 and 1/3 power log 1 epsilon)). Numerical results supporting this estimate are included. Author (GRA)

N82-31023# Yale Univ., New Haven, Conn. Dept. of Computer Science.
LOCAL-MESH, LOCAL-ORDER, ADAPTIVE FINITE ELEMENT METHODS WITH A POSTERIORI ERROR ESTIMATORS FOR ELLIPTIC PARTIAL DIFFERENTIAL EQUATIONS
Alan Weiser Dec. 1981 144 p refs Prepared in cooperation with Florida State Univ., Tallahassee Sponsored in part by NSF
(Contracts N00014-76-C-0277; N00014-80-C-0076; DE-AC02-77ET-53053)
(AD-A115432; TR-213) Avail: NTIS HC A07/MF A01 CSCL 12/1

The traditional error estimates for the finite element solution of elliptic partial differential equations are a priori, and little information is available from them about the actual error in a specific approximation to the solution. In recent years, locally computable a posteriori error estimators have been developed, which apply to the actual errors committed by the finite element method for a given discretization. These estimators lead to algorithms in which the computer itself adaptively decides how and when to generate discretizations. So far, for two-dimensional problems, the computer-generated discretizations have tended to use either local mesh refinement, or local order refinement, but not both. In this thesis, we present a new class of local-mesh, local-order, square finite elements which can easily accommodate computer-chosen discretizations. We present several new locally-computable a posteriori error estimators which, under reasonable assumptions, asymptotically yield upper bounds on the actual errors committed, and algorithms in which the computer uses the error estimators to adaptively produce sequences of local-mesh, local-order discretizations. GRA

N82-31024# Yale Univ., New Haven, Conn. Dept. of Computer Science.
VARIATIONAL ITERATIVE METHODS FOR NONSYMMETRIC SYSTEMS OF LINEAR EQUATIONS
Stanley C. Eisenstat, Howard C. Elman, and Martin H. Schultz Aug. 1981 28 p refs
(Contracts N00014-76-C-0277; N00014-80-C-0076;

DE-AC02-77ET-53053)
(AD-A115365; RR-209) Avail: NTIS HC A03/MF A01 CSCL 12/1

We consider a class of interative algorithms for solving systems of linear equations where the coefficient matrix is nonsymmetric with positive-definite symmetric part. The algorithms are modelled after the conjugate gradient method, and are well-suited for large sparse systems. They do not make use of any associated symmetric problems. Convergence results and error bounds are presented. Author (GRA)

N82-31025# Yale Univ., New Haven, Conn. Dept. of Computer Science.
THE POSITIVE SOLUTION OF A CERTAIN NONLINEAR PARABOLIC SYSTEM AND IT'S COMPUTATION, 1
Benren Zhu 30 Sep. 1981 17 p refs
(Contract N00014-76-C-0277)
(AD-A115364; TR-210) Avail: NTIS HC A02/MF A01 CSCL 12/1

We investigated a type of nonlinear parabolic equation, coupled equations and their positive solutions. The properties of maximum and the nonlinear instabilities are discussed briefly; for obtaining its numerical solution a special scheme is presented. GRA

N82-31026# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Nuclear Effects.
SMOOTH FIT ANALYSIS OF MOESSBAUER SPECTRA M.S. Thesis
Thomas L. Bazzoli Mar. 1982 110 p refs
(AD-A115483; AFIT/GNE/PH/82-2) Avail: NTIS HC A06/MF A01 CSCL 12/1

A method of fitting the magnetic field distribution from Mossbauer spectra using a linear least-squares technique was proposed where the distribution is assumed to be an expansion in Hermite polynomials. This method was developed, programmed and tested on a test spectrum with a known distribution of magnetic field. The programming was not entirely successful in reproducing this test spectra and no actual data was analyzed to support the effectiveness of this method. Author (GRA)

N82-31027# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
NONPARAMETRIC ESTIMATION OF DISTRIBUTION AND DENSITY FUNCTIONS WITH APPLICATIONS Ph.D. Thesis
James Sweeder May 1982 275 p refs
(AF Proj. 2404)
(AD-A115491; AFIT/DS/MA/82-1) Avail: NTIS HC A12/MF A01 CSCL 12/1

This report presents the theoretical development, evaluation, and applications of a new nonparametric family of continuous, differentiable, sample distribution functions. Given a random sample of independent, identically distributed random variables, estimators are constructed which converge uniformly to the underlying distribution. A smoothing routine is proposed which preserves the distribution function properties of the estimators. Using mean integrated square error as a criterion, the new estimators are shown to compare favorably against the empirical distribution function. As density estimators, their derivatives are shown to be competitive with other continuous approximations. Numerous graphical examples are given. New goodness of fit tests for the normal and extreme value distributions are proposed based on the new estimators. Eight new goodness of fit statistics are developed. Extensive Monte Carlo studies are conducted to determine the critical values and powers for tests when the null hypothesis is completely specified and when the parameters of the null hypothesis are estimated. These tests were shown to be comparable with or superior to tests currently used. Author (GRA)

N82-31028# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Operations Research.
A NEW GOODNESS OF FIT TEST FOR NORMALITY WITH MEAN AND VARIANCE UNKNOWN M.S. Thesis
Thomas John Ream Dec. 1981 107 p refs
(AD-A115496; AFIT/GOR/MA/81D-9) Avail: NTIS HC A06/MF A01 CSCL 12/1

A new technique for calculating known goodness of fit statistics for the Normal distribution is investigated. Samples are generated for a Normal (0, 1) distribution. The means of these samples are calculated and the samples are doubled by reflecting sample data points about the individual sample means. This reflection of data points about the individual sample means. This reflection of data points about the mean is the new technique for generating modified statistics. After the sample is doubled, critical values are calculated for these modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises statistics. Critical values are for the original sample sizes. An extensive power study is done to test the power of the three new statistics' critical values versus the power for the same three statistics, calculated without reflection. Powers of the new statistics are asymptotically slightly higher than the powers of their non-reflected counterparts, when the distribution tested is also symmetrical. The powers of new statistics are substantially lower when the distribution tested is non-symmetrical. The powers are substantially higher for the modified statistics when the continuous Uniform distribution is tested. Complete tables of critical values for sample sizes n = 3 through n = 60 are included for the modified Kolmogorov-Smirnov and Anderson-Darling statistics.
Author (GRA)

N82-31029# Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht (West Germany). Inst. fuer Physik.
NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS IN PHYSICS, PART 2 [NUMERISCHE LOESUNG PARTIELLER DIFFERENTIALGLEICHUNGEN DER PHYSIK, TEIL 2]
D. Eppel, J. Haeuser, and F. Tanzer (Giessen Univ., West Germany) 1982 68 p refs In GERMAN; ENGLISH summary
(GKSS-82/E/4; ISSN-0344-9629) Avail: NTIS HC A04/MF A01

Criteria for the assessment of numerical procedures are given as well as methods for the investigation of the stability of difference equations. All methods are illustrated by numerical examples. Transport processes as they occur in environmental sciences are accounted for. The solution of systems of linear equations, and storage of large matrices, are described. These methods, mainly based on iteration schemas, are also treated through numerical examples. Author (ESA)

N82-31030# Indian Inst. of Tropical Meteorology, Poona.
ON ACCELERATING THE FFT OF COOLEY AND TUKEY
S. K. Mishra Feb. 1981 30 p refs
(PB82-146119) Avail: NTIS HC A03/MF A01 CSCL 12A

The efficient Fourier transform (EFT), and the fast Fourier transform (FFT) algorithms are described, and their computational efficiencies with respect to the direct method are discussed. An efficient procedure is proposed for the reordering of data set; the use of EFT algorithm for the initial Fourier transforms and restricting the size of final subsets to not less than four are also suggested for saving computation time in the FFT. It is found that on average the FFT with the proposed modifications is more than twice as fast as the original FFT. The amount of overhead operations involved in computer routine, based on the modified FFT, is estimated. GRA

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-31031*# Harvard Univ., Cambridge, Mass. Div. of Applied Sciences.
SIMULTANEOUS STABILIZATION AND SIMULTANEOUS POLE PLACEMENT BY NONSWITCHING DYNAMIC COMPENSATION
B. K. Ghosh and C. I. Byrnes [1982] 24 p refs
(Grants NsG-2265; NSC-2265; NSF ECS-81-21428; AF-AFOSR-0054-81)
Avail: NTIS HC A02/MF A01 CSCL 12A

The 'simultaneous stabilization problem' is defined and theorems are proposed for its solution. The problem consists in

answering the question: given an r-tuple G sub 1(s), G sub r(s) of p x m proper transfer functions, does there exist a compensator K(s) such that the closed loop systems G sub 1(s) (I+K(s)G sub 1(s)) (-1), G sub r(s) (I+K(s) G sub r(s)) (-1) are (internally) stable. This question arises in reliability theory, where G sub 2(s), G sub r(s) represents a plant G sub 1(s) operating in various modes of failure and K(s) is a nonswitching stabilizing compensator. It is important in the stability analysis and design of a plant which can be switched into various operating modes. The simultaneous stabilization problem can also apply to the stabilization of a nonlinear system which is linearized at several equilibria. Conditions are defined for pole placement and the generalized Sylvestor matrix is discussed. M.G.

N82-31032# Royal Military Coll. of Science, Shrivenham (England). Dept. of Mathematics and Ballistics.

ESTIMATING HIT PROBABILITIES ON RECTANGULAR TARGETS

M. D. Sandford Mar. 1981 10 p

(TN-MB-81/1; BR78680) Avail: NTIS HC A02/MF A01

Under assumptions of normality and independence, the probability of hit of a single round on a rectangular target is a function of the unknown population standard deviation in the coordinate directions. When those standard deviations are estimated the probability of hit is also estimated. A method is given for putting an approximate limit on the probability of hit. This has application to acceptance sampling inspection when ammunition that has a high probability of hit and thus small (population) standard deviations should have a high chance of acceptance. M.G.

N82-31033 Royal Aircraft Establishment, Farnborough (England).

THE PHASE PROBABILITY DENSITY FUNCTION OF A RANDOM WALK IN TWO DIMENSIONS

B. C. Barber Nov. 1982 72 p refs

(RAE-TR-81143; RAE-Space-609; BR82880) Avail: NTIS HC A04/MF A01

Determinaton of the phase probability density function of the resultant of an N-step nonisotropic random walk in two dimensions was examined. A formula for the joint probability density function of angle and radius of the resultant for arbitrary step angle probability density, and for any number of steps is obtained. The theory of generalized functions concentrated on smooth manifolds is applied. Asymptotic solutions are found for the case where the phase probability density of each step is the same Gaussian function, periodically wrapped onto the interval (-pi, +pi). Solutions for small phase variance for any number of steps, and for large variance for both small and large numbers of steps, are presented. Author (ESA)

N82-31034# Educational Testing Service, Princeton, N. J.

STATISTICAL BIAS IN MAXIMUM LIKELIHOOD ESTIMATORS OF ITEM PARAMETERS

Frederic M. Lord Apr. 1982 37 p refs

(Contract N00014-80-C-0402)

(AD-A114995; RR-82-20-ONR) Avail: NTIS HC A03/MF A01 CSCL 12/1

Formulas are derived for the bias in the maximum likelihood estimators of the item parameters in the logistic item response model when examinee abilities are known. Numerical results are given for a typical verbal test for college admission.

Author (GRA)

N82-31035# Naval Coastal Systems Center, Panama City, Fla.

BINOMIAL SEQUENTIAL TEST DESIGN FOR TESTING PROBABILITY OF AN EVENT Technical Memo, Aug. - Oct. 1981

G. O. Jones Mar. 1982 64 p refs

(AD-A114963; AD-F200027; NCSC-TM-341-82) Avail: NTIS HC A04/MF A01 CSCL 12/1

A statistical test design is described to determine if the probability of an event is at a certain level. The procedure is illustrated by an example. A computer program for the test design is given. A table of 120 test designs is provided plus a table of sample sizes versus hypotheses. Author (GRA)

N82-31036# Wisconsin Univ., Madison. Mathematics Research Center.

SOME PENALIZED LIKELIHOOD PROCEDURES FOR SMOOTHING PROBABILITY DENSITIES

Taskin Atilgan and Tom Leonard Feb. 1982 25 p refs

(Contract DAAG29-80-C-0041)

(AD-A114623; MRC-TSR-2336) Avail: NTIS HC A02/MF A01 CSCL 12/1

Some methods are considered for the estimation of probability densities. They employ a linear approximation to either the density or the logistic density transform. The coefficients in the approximation are estimated by maximum likelihood and the number of terms is judged via an information criterion. Hence the traditionally difficult problem of judging the degree of smoothness is carried out in a relatively simple manner. Criteria considered include the penalties proposed by Akaike and Schwarz for model complexity, together with an empirical criterion based upon a plot of the log-likelihoods. The practical procedures are related to an asymptotic consistency argument and a number of numerical examples are presented. GRA

N82-31037# Wisconsin Univ., Madison. Mathematics Research Center.

A BAYESIAN APPROACH TO MARKOVIAN MODELS FOR NORMAL AND POISSON DATA

Tom Leonard Feb. 1982 23 p refs

(Contract DAAG29-80-C-0041)

(AD-A114622; MRC-TSR-2337) Avail: NTIS HC A02/MF A01 CSCL 12/1

A Bayesian updating procedure is proposed for filtering the process parameters in the two-stage Markovian constant variance model for time varying normal data in the situation where the signal to noise ratio is unknown. A forecasting procedure is described which yields the entire predictive distribution of future observations; a numerical study involves an on-line analysis for chemical process concentration readings. A similar method is developed for Poisson data and applied to the analysis of an industrial control chart. GRA

N82-31038# Wisconsin Univ., Madison. Mathematics Research Center.

BAYES ESTIMATION OF A MULTIVARIATE DENSITY

Tom Leonard Feb. 1982 17 p refs

(Contract DAAG29-80-C-0041)

(AD-A114579; MRC-TSR-2342) Avail: NTIS HC A02/MF A01 CSCL 12/1

The problem addressed concerns the estimation of a p-dimensional multivariate density, given only a set of n observation vectors, together with information that the density function is likely to be reasonably smooth. A solution is proposed which employs up to $n + 1/2\ p(p+1)$ smoothing parameters, all of which may be estimated by their posterior means. This avoids the well-known difficulties, associated with even one-dimensional kernel estimators, of estimating the bandwidth or smoothing parameter by a mathematical procedure. The posterior mean value function, unconditional upon the smoothing parameters, turns out to be a data-based mixture of multivariate t-distributions. The corresponding estimate of the sampling covariance matrix may be viewed as a shrinkage estimator of the Bayes-Stein type. The results involve some finite series which may be evaluated by straightforward simulation procedure.

Author (GRA)

N82-31039# Wisconsin Univ., Madison. Mathematics Research Center.

A NEW CLASS OF HERMITE-BIRKHOFF QUADRATURE FORMULAS OF GAUSSIAN TYPES

Nira Dyn Dec. 1981 16 p refs

(Contract DAAG29-80-C-0041)

(AD-A114487; MRC-TSR-2314) Avail: NTIS HC A02/MF A01 CSCL 12/1

It is shown how to combine incidence matrices, which admit Hermite-Birkhoff quadrature formulas of Gaussian type for any positive measure, in such a way that the resulting matrix also admits Gaussian type quadratures for any positive measure. Moreover, the uniqueness property and the extremal property of the formulas corresponding to the submatrices are transferred to the formula admitted by the composed matrix. Author (GRA)

N82-31040# Temple Univ., Philadelphia, Pa. Dept. of Mathematics.
ASYMPTOTIC DISTRIBUTION OF EXTREMES Final, Technical Report, 1 Dec. 1977 - 30 Nov. 1981
Janos Galambos 28 Jan. 1982 10 p refs
(Grant AF-AFOSR-3504-78; AF Proj. 2304)
(AD-A115145; AFOSR-82-0437TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

This final report summarizes the results obtained by the principal investigator on the asymptotic distribution of extremes during the years 1978-1981. These results discuss the role of the choice of the population distribution in a classical model for extremes (including characterizations) as well as the necessity for deviating from the classical model for describing real life situations. Several classes of dependent random variables, with considerable detail on exchangeability, are discussed with the main focus on the behavior of their extremes. Particular emphasis is put on reliability applications and on material strength distributions. Because of the prominent role of the exponential distribution in reliability theory, the principal investigator collected material on this distribution (both on the applicability of the exponential distribution in model building and a large variety of techniques in statistical inference). In addition to asymptotic distributions, sharp inequalities are discussed which can be applied with success to two types of problems of extreme value theory: estimating system reliability and determining whether a particular assumed model contradicts reality. Extensions of some univariate results on domains of attraction to a particular asymptotic extreme value distribution are given to the multivariate case. In the univariate case, a statistical test is proposed on deciding whether the population distribution belongs to the domain of attraction of a particular extreme value distribution. Author (GRA)

N82-31041# Pennsylvania State Univ., University Park. Dept. of Statistics.
ON THE USE OF RANK TESTS AND ESTIMATES IN THE LINEAR MODEL
James C. Aubuchon and Thomas P. Hettmansperger Jun. 1982 37 p refs
(Contract N00014-80-C-0741; NR Proj. 042-446)
(AD-A115266; TR-41) Avail: NTIS HC A03/MF A01 CSCL 12/1

The current status, including small-sample behavior and ease of computation, of rank-based estimates and tests in the general linear model is reviewed. For the important special case of Wilcoxon scores, details of application of various procedures are discussed. The three different testing methods considered may each be motivated by connecting it to one of three forms of the usual least-squares F statistic. Possible algorithms for computation of rank-based estimates and tests are presented. Each procedure is applied to an example using data. Finally, the technical assumptions made to obtain large-sample properties of these procedures, including the general-scores case, are outlined and discussed. Author (GRA)

N82-31042# Cornell Univ., Ithaca, N. Y. School of Operations Research and Industrial Engineering.
ON THE PERFORMANCE CHARACTERISTICS OF A CLOSED ADAPTIVE SEQUENTIAL PROCEDURE FOR SELECTING THE BEST BERNOULLI POPULATION
Robert E. Bechhofer and Radhika V. Kulkarni (North Carolina Univ., Chapel Hill) Apr. 1982 73 p refs
(Contracts DAAG29-81-K-0168; N00014-75-C-0586)
(AD-A115219; TR-532; ARO-18396.1-MA) Avail: NTIS HC A04/MF A01 CSCL 12/1

In a recent paper, Bechhofer and Kulkarni proposed closed adaptive sequential procedures for a general class of k-population Bernoulli selection goals. These sequential selection procedures achieve the same probability of a correct selection, uniformly in the unknown single-trial 'success' probabilities pi (1 < or = i < or = k), as do the corresponding single-stage selection procedures which take exactly n observations from each of the k populations. The sequential procedures always require less (often substantially less) than kn observations to terminate experimentation. In the present paper we specialize these procedures, and focus on the particular goal of selecting the population associated with p sub k where p(1) < or =...< or = p(k) are the ordered pi (1 < or = < or = k). These results along with other related ones will assist the potential user of the sequential procedure in assessing its merits relative to those of other competing procedures. GRA

N82-31043# Stanford Univ., Calif. Dept. of Statistics.
ON THE PROBLEMS OF CONSTRUCTION AND STATISTICAL INFERENCE ASSOCIATED WITH A GENERALIZATION OF CANONICAL VARIABLES
Ashis Sen Gupta Feb. 1982 55 p refs
(Contract N00014-75-C-0442; NR Proj. 042-034)
(AD-A115315; SU-TR-52) Avail: NTIS HC A04/MF A01 CSCL 12/1

Canonical correlation analysis provides a means by which the relation between two sets of variates can be assessed. The present study is concerned with an extension to K sets of variates. As in the case of two sets of variates, linear combinations of the variates are used, but now alternative criteria need be defined. The criteria developed are based on the generalized variance. Properties and tests using this criterion are obtained. Author (GRA)

N82-31044# Stanford Univ., Calif. Dept. of Statistics.
ON THE THEORY OF MULTIVARIATE ELLIPTICALLY CONTOURED DISTRIBUTIONS AND THEIR APPLICATIONS
T. W. Anderson and Kai-Tai Fang May 1982 49 p refs
(Contract N00014-75-C-0442; NR Proj. 042-034)
(AD-A115316; SU-TR-54) Avail: NTIS HC A03/MF A01 CSCL 12/1

In this paper, the multivariate elliptically contoured distributions which generalize the elliptically contoured distribution to the case of a matrix are defined and a special class of multivariate elliptically contoured distributions is studied in detail. For this class we obtain the distributions of the following statistics: correlation coefficients, multiple correlation coefficients, Hotelling's T2, sample covariance matrix, generalized variance, characteristic roots of the covariance matrix, quadratic forms, etc. Some multivariate statistical applications are discussed. Author (GRA)

N82-31045# Cornell Univ., Ithaca, N. Y. School of Operations and Industrial Engineering.
STATISTICAL ENGINEERING
Robert E. Bechhofer 28 May 1982 56 p refs
(Contract N00014-75-C-0586)
(AD-A115522) Avail: NTIS HC A03/MF A01 CSCL 12/1

This is the FINAL REPORT on ONR Contract N00014-75-C-0586 entitled 'Statistical Engineering' with Dr. Robert Bechhofer as Principal Investigator. The contract was initiated on June 1, 1975 and was renewed five times through March 31, 1982. ANNUAL REPORTS were submitted to cover the following periods: FIRST REPORT (6/1/75-8/31/75), SECOND REPORT (9/1/75-8/31/76), THIRD REPORT (9/1/76-8/31/77). In addition, a SPECIAL REPORT (requested by Dr. E J. Wegman, Director of the Statistics and Probability Program) summarizing the research accomplishments achieved on the contract was submitted on 8/14/78. Copies of these reports are attached. This FINAL REPORT describes research accomplishments subsequent to the SPECIAL REPORT. Author (GRA)

N82-31046# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
FINITE MARKOV CHAIN MODELS SKIP-FREE IN ONE DIRECTION
G. Latouche, Donald P. Gaver (Brussels Univ.), and P. A. Jacobs Apr. 1982 58 p refs Sponsored in part by IBM
(Contract N00014-82-WR-20017; Grant NSF ENG-79-10825; RR014050E; NR Proj. 609-006)
(AD-A115128; NPS55-82-015; TR-123) Avail: NTIS HC A04/MF A01 CSCL 12/1

Finite Markov processes are considered, with bi-dimensional state space, such that transitions from state (n,i) to state (m,j) are possible only if m < or = n+1. The analysis leads to efficient computational algorithms, to determine the stationary probability distribution, and moments of first passage times. Author (GRA)

N82-31047# North Carolina Univ., Chapel Hill. Curriculum in Operations Research and Systems Analysis.

SIMULATING A MARKOV CHAIN WITH A SUPEREFFICIENT SAMPLING METHOD
George S. Fishman Apr. 1982 42 p refs
(Contract N00014-26-S-0302)
(AD-A115451; UNC/ORSA/TR-82/3) Avail: NTIS HC A03/MF A01 CSCL 12/2

This paper describes an algorithm and a FORTRAN subprogram, CHAIN, for simulating the behavior of an (n+1) state Markov chain using a variance reducing technique called rotation sampling. The simulation of k microreplications is carried out in parallel at a mean cost < or = O(1n k) and with variances of sample quantities of interest < or = O((1n k squared)/k squared). The program allows for independent macroreplications, each of k microreplications, in order to faciliate estimation of the variances of sample quantities of interest. The paper describes theoretical results that underlie the algorithm and program in Section 1 and presents applications of interest for first passage time and steady-state distributions in Section 2. Section 3 describes the algorithm and CHAIN and an example in Section 4 illustrates how CHAIN works in practice. Section 5 describes the options available for restarting the simulation. Author (GRA)

N82-31048# Stanford Univ., Calif. Dept. of Statistics.
ON ASYMMETRIC STOCHASTIC BANG-BANG CONTROL
Howard J. Weiner 6 Apr. 1982 12 p refs
(Contract N00014-76C-0475; NR Proj. 042-267)
(AD-A115393; SU-TR-316) Avail: NTIS HC A02/MF A01 CSCL 12/1

Three stochastic bang-bang control problems, the predicted miss, the linear regulator, and a complete observation model are shown to have formally similar solutions under asymmetric boundedness condition on the control u(t), 0< t< T. Author

N82-31049# Stanford Univ., Calif. Dept. of Statistics.
UPDATING SUBJECTIVE PROBABILITY
Persi Diaconis and Sandy L. Zabell 2 Mar. 1982 41 p refs
(Contract N00014-76-C-0475; NR Proj. 042-267)
(AD-A115391; SU-TR-315) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper discusses some of the mathematical properties of Jeffrey's rule for revising a probability P to a new probability P*, connecting it with sufficient partitions, and maximum entropy updating of contingency tables. The main results concern simultaneous revision on two partitions. GRA

N82-31050# Stanford Univ., Calif. Dept. of Statistics.
DISTRIBUTIONS OF QUADRATIC FORMS AND COCHRAN'S THEOREM FOR ELLIPTICALLY CONTOURED DISTRIBUTIONS AND THEIR APPLICATIONS
T. W. Anderson and Kai-Tai Fang May 1982 37 p refs
(Contract N00014-75-C-0442; NR Proj. 042-034)
(AD-A115355; TR-53) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper extends the theory of the distributions of quadratic forms and Cochran's theorem from normal populations to elliptically contoured distributions. Some interesting applications are discussed. In addition, some properties of quadratic forms of normal distributions are shown, in fact, to characterize normality. Author (GRA)

N82-31051# Stanford Univ., Calif. Dept. of Statistics.
AN ESTIMATION PROBLEM WITH POISSON PROCESSES
Alan E. Gelfand 20 Apr. 1982 31 p refs
(Contract N00014-76-C-0475; NR Proj. 042-267)
(AD-A115346; SU-TR-317) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper considers an estimation problem involving n independent Poisson processes such that the i-th process has intensity function lambda (intensity)(t) = delta (intensity) p(t; alpha). It is of interest to estimate p(t; alpha). Two estimation procedures are developed, one using the exact arrival times of observations, the second using categorical arrival times of observations. Two specific instances of p(t), an exponential and a bilinear form are investigated further. An example applying the methodology to the active life of a judicial opinion is described. Author (GRA)

N82-31052# Stanford Univ., Calif. Dept. of Statistics.
STEINHAUS' GEOMETRIC LOCATION PROBLEM FOR RANDOM SAMPLES IN THE PLANE
Dorit Hochbaum and J. Michael Steele 11 May 1982 25 p refs
(Contract N00014-76-C-0475; NR Proj. 042-267)
(AD-A115376; TR-318) Avail: NTIS HC A02/MF A01 CSCL 12/1

The work of H. Steinhaus was apparently the first explicit treatment of the natural question 'How should one choose n points from a mass distributed in the plane so as to best represent the whole? The main objective of this article is to treat a stochastic analogue of Steinhaus' problem. One principle motivation for this stochastic analogue comes from developments in the theory of algorithms. The first of these is the discovery of Karp of an efficient probabilistic algorithm for solving the traveling sal- man problem. The second development was the proof of Papadimitriou of the conjecture of Fisher and Hochbaum that the 'Euclidean k-median location problem' is NP-complete. GRA

N82-30850*# Arizona Univ., Tucson. Human Factors/Man Machine Systems Lab.
A MODEL OF SUBJECTIVE PROBABILITIES FROM SMALL GROUPS
William R. Ferrell and Kelly Rehm *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 271-284 refs (For primary document see N82-30833 21-51)
(Grant NSF ENG-78-09365)
Avail: NTIS HC A99/MF A01 CSCL 12A

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-31053*# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
DEVELOPMENT OF A FLASH, BANG, AND SMOKE SIMULATION OF A SHELL BURST Final Technical Report
F. R. Williamson, J. F. Kinney, and T. V. Wallace Jan. 1982 165 p Prepared for JPL, Pasadena, Calif.
(Contracts NAS7-100; JPL-956058)
(NASA-CR-169251; NAS 1.26.169251; GIT/EES-A-2971)
Avail: NTIS HC A08/MF A01 CSCL 12B

A large number of experiments (cue test firings) were performed in the definition of the cue concepts and packaging configurations. A total of 344 of these experiments were recorded with instrumentation photography to allow a quantitative analysis of the smoke cloud to be made as a function of time. These analyses were predominantly made using a short test site. Supplementary long range visibility tests were conducted to insure the required 3 kilometer visibility of the smoke signature. S.L.

N82-31054# RAND Corp., Santa Monica, Calif.
PERFORMANCE NORMS IN NON-MARKET ORGANIZATIONS: AN EXPLORATORY SURVEY
Charles Eby Apr. 1982 108 p refs Sponsored by Yale Univ.
(RAND/N-1830-YALE) Avail: NTIS HC A06/MF A01

'Internalities', or internal performance norms, are considered among the shortcomings to which non-market organizations (NMOs) and activities are prone. Three classes of internal operating decisions are investigated, relating to: (1) budget allocations, (2) project evaluation, and (3) promotion and termination of personnel. Governmental and non-governmental NMOs are compared. Author

N82-31055# Wisconsin Univ., Madison. Mathematics Research Center.
A UNIFIED METHOD FOR CONSTRUCTING PBIB DESIGNS BASED ON TRIANGULAR AND L2 SCHEMES Technical Summary Report
Ching-Shui Cheng Nov. 1981 15 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-09502)
(AD-A114488; MRC-TSR-2304) Avail: NTIS HC A02/MF A01 CSCL 12/2

A general and simple method for constructing triangular and L sub 2 type partially balanced incomplete block (PBIB) designs is presented. This method unifies several well-known methods, and produces many new series of designs. The idea is based on a well-known relation of triangular and L sub 2 type PBIB designs to line graphs. Triangular or L sub 2 type PBIB designs can often be obtained by suitably 'symmetrizing' a given initial block. Author (GRA)

N82-31056# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A COMPUTERIZED ALGORITHM FOR SOLVING MULTI-STAGE SIMULTANEOUS GAMES M.S. Thesis

Mohamed Abdelrahman Fateen Dec. 1981 145 p refs
(AD-A115536; AFIT/GOR/MA/81D-5) Avail: NTIS HC A07/MF A01 CSCL 15/7

The algorithm developed in this study finds the solution to multi-stage simultaneous games. A dynamic programming approach is used to solve the multi-stage game. The main idea of the solution is to build at each stage a matrix whose values are the payoffs obtained by playing each of the given strategies at this stage and the optimal strategies for the remaining stages. This payoff matrix is then solved using a linear programming algorithm. Author (GRA)

N82-31057# Stanford Univ., Calif. Dept. of Operations Research.

CONSTRUCTING A MINIMAL COST SPANNING TREE SUBJECT TO RESOURCE CONSTRAINTS AND FLOW REQUIREMENTS

Andrew W. Shogan Nov. 1981 56 p refs
(Contract N00014-75-C-0561; NR Proj. 047-200)
(AD-A115354; TR-200) Avail: NTIS HC A04/MF A01 CSCL 12/1

Consider a network in which one node is a source having an infinite supply of a commodity, and every other node is a sink having a known constant demand. Furthermore, associated with each potential arc of the network are the following known constants: the cost of constructing the arc, the amount of each scarce resource consumed during the construction of the arc, and the flow capacity of the arc. Given the above known constants as well as the available supply of each of the scarce resources, the problem is to construct a minimal cost spanning tree subject to the limitations on the consumption of the scarce resources and the requirement that there exists a flow from the source satisfying the demands at the sinks without exceeding any arc capacity. This paper discusses the solution of such a problem by a branch-and-bound algorithm base on Lagrangean relaxation. Also included are applications of the problem, extensions to the problem, and a report on preliminary computational experience with a computer implementation of the algorithm. Author (GRA)

N82-31058# State Univ. of New York, Buffalo. Group for Computer Studies of Strategies.

A MULTI-STRATEGY GAMING ENVIRONMENT Interim Report, 1 Jul. 1981 - 30 Mar. 1982

Nicholas V. Findler, George L. Sicherman, and Bede McCall Mar. 1982 43 p refs Submitted for publication
(Grant AF-AFOSR-0220-81; AF Proj. 2304)
(AD-A115380; GCSS-TR-9; GCSS-TR-196; AFOSR-82-0465TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

The authors, together with a large and varying number of collaborators, worked on a long-term project aimed at how decisions are and should be made under uncertainty and risk. Learning programs of different types have come to the center of their attention, both in the course of trying to simulate human recognitive behavior and in constructing wholly machine intelligence-oriented competitive strategies. They describe an interactive environment in which an arbitrary number of human and machine strategies, up to a total of eight, can be pitted against each other. The game of draw poker was selected as the vehicle of these studies since it shares many characteristics with real-life decision-making tasks. This project has come to an end. The authors also describe their current work on automatic analysis and synthesis of strategies. Although the systems being developed are highly context-independent, they are able to utilize their experience gained in the previous project. Author (GRA)

N82-31059# Mathematical Sciences Northwest, Inc., Bellevue, Wash.

REFERENCE MANUAL OF DATA SOURCES FOR LOAD FORECASTING Final Report

L. Andrews and C. McDonald Sep. 1981 480 p refs Sponsored by EPRI
(EPRI Proj. 1478-1)
(DE82-900319; EPRI-EA-2008) Avail: NTIS HC A21/MF A01

The quality and availability of data for use in electricity load forecast models are examined. The data sources available for more than 100 variables used in these forecast models are documented, and the quality of the data is evaluated. Also, a description of aggregate econometric and disaggregate econometric or end-use models is presented. Forecasting issues, such as methods of incorporating the effects of conservation programs or government regulations in the forecast, are discussed. The customer survey method of forecasting is presented in detail. The discussion covers survey methodology, sample questionnaires, and recommendations for dealing with the problems associated with the low response rate typical of mail surveys. In particular, it is recommended that a telephone followup survey be made of the mail-survey nonrespondents. DOE

N82-31060# Engins Matra, Velizy (France).

STUDY ON MANNED VERSUS AUTOMATED SPACE ACTIVITIES, EXECUTIVE SUMMARY Final Report

Lam DoMau, Gerard Berger, J.-Louis Lacombe, Eric Zeis, and Jean Vertut (Commissariat a l'Energie Atomique) Paris ESA Dec. 1980 186 p refs
(Contract ESA-4267/80)
(Rept-DX60/0196; ESA-CR(P)-1561) Avail: NTIS HC A09/MF A01

The role of man in space was assessed, and the state of the art of automation relevant to space applications was examined. Major functions in space which can be performed either by man or an automatic system (rendezvous and docking, transfer operations, assembly and deployment) were reviewed. The implications of manned and unmanned approaches to a future material processing mission in low Earth orbit, and a geostationary telecommunication platform project are discussed. Both approaches are possible for future missions, but in the short-term, when experimentation and tests are necessary, human presence is required. In the long-term, when industrialization imposes cost optimization of routine activities, automated processes become pre-eminent. Author (ESA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-31061# Wisconsin Univ., Madison. Mathematics Research Center.

STRUCTURE OF INVERTIBLE (BI) INFINITE TOTALLY POSITIVE MATRICES

C. deBoor, Rong-ging Jia, and A. Pinkus (Technion, Haifa) Dec. 1981 20 p refs
(Contract DAAG29-80-C-0041)
(AD-A114494; MRC-TSR-2311) Avail: NTIS HC A02/MF A01 CSCL 12/1

An I subinfinity-invertible nonfinite totally positive matrix A is shown to have one and only one main diagonal. This means that exactly one diagonal of A has the property that all finite sections of A principal with respect to this diagonal are invertible and their inverses converge boundedly and entrywise to A to the -1 power. This is shown to imply restrictions on the possible shapes of such a matrix. In the proof, such a matrix is also shown to have a I subinfinity invertible LDU factorization. In addition, decay of the entries of such a matrix away from the main diagonal is demonstrated. It is also shown that a bounded sign-regular matrix carrying some bounded sequence to a uniformly alternating sequence must have all its columns in c sub o. Author (GRA)

N82-31062# Wisconsin Univ., Madison. Mathematics Research Center.

A SPECTRAL MAPPING THEOREM FOR THE EXPONENTIAL FUNCTION AND SOME COUNTEREXAMPLES Technical Summary Report

Tosio Kato Jan. 1982 8 p refs
(Contract DAAG29-80-C-0041)
(AD-A114486; MRC-TSR-2316) Avail: NTIS HC A02/MF A01 CSCL 12/1

Elementary proofs are given for the (known) theorems that (1) each point of superscript sigma(A) belongs to superscript sigma (e superscript A) if A is the generator of a C sub 0-semigroup E superscript tA) of linear operators on a Banach space x, and that (2) e superscript sigma(A) equal Sigma (e superscript A)/(0) if e superscript tA is a holomorphic semigroup. Also a large class of strongly continous groups e superscript tA on a Hilbert space H is given such that Sigma (A) is empty. Note that Sigma (e superscript A) is not empty, and is away from zero, if e superscript tA is a group. Some related remarks are given on the relationship between the spectral bound of A and the type of e superscript tA. Author (GRA)

N82-31063# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

SOLVING THE FIND-PATH PROBLEM BY REPRESENTING FREE SPACE AS GENERALIZED CONES

Rodney A. Brooks May 1982 22 p refs
(Contracts N00014-81-K-0494; N00014-80-C-0505)
(AD-A115047; AIM-674) Avail: NTIS HC A02/MF A01 CSCL 12/1

Free space is represented as a union of (possibly overlapping) generalized cones. An algorithm is presented which efficiently finds good collision free paths for convex polygonal bodies through space littered with obstacle polygons. The paths are good in the sense that the distance of closest approach to an obstacle over the path is usually far from minimal over the class of topologically equivalent collision free paths. The algorithm is based on characterizing the volume swept by a body as it is translated and rotated as a generalized cone and determining under what conditions one generalized cone is a subset of another.
Author (GRA)

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-31064# Pennsylvania Univ., Philadelphia. Dept. of Physics.

PHOTOEMISSION FROM CONDENSED LAYERS OF H2 ON Cu AND Au Interim Technical Report

W. Eberhardt (Brookhaven National Lab.), R. Cantor (Brookhaven National Lab.), F. Greuter, and E. W. Plummer 13 May 1982 13 p refs Submitted for publication
(Contract N00014-79-C-0991)
(AD-A114842; TR-12) Avail: NTIS HC A02/MF A01 CSCL 20/3

We have measured the photoemission of monolayers as thick films of H2 molecules condensed onto Cu and Au. The adsorbed monolayer exhibits a relaxation energy of 1.75 eV whereas we see a bandlike Is state for thick layers having a bandwidth of 1.2 eV. We also observe energy loss features which are in agreement with previous electron energy loss and optical absorption studies. GRA

N82-31065# Los Alamos Scientific Lab., N. Mex.

PERFORMANCE OF LARGE MAGNETS UNDER TRANSIENT VOLTAGES

P. Chowdhuri and M. Anderson 1981 5 p refs Presented at the 9th Symp. on Eng. Probl. of Fusion Res., Chicago, 26-29 Oct. 1981
(Contract W-7405-eng-36)
(DE82-002380; LA-UR-81-3107) Avail: NTIS HC A02/MF A01

Studies were performed to determine the severity of transient electrical stresses in two superconducting energy storage coils. One is a 300 kJ single layer coil and the other is a 30 MJ pancake coil. The resonant space harmonics of the coils were measured at room temperature and confirmed by analysis. The first space harmonic of the 300 kJ coil was measured at 577 kHz, and its peak amplitude was about 12 times the input signal. The first space harmonic of the 30 MJ coil was measured at 7.3 kHz. The nonuniform initial voltage distribution along the 30 MJ coil was analyzed theoretically for a step-function input voltage by use of the standing-wave theory. The analysis was performed for two cases with metal and insulating dewars. The transient voltage across the first two turns of the coil with the metal dewar was almost three times as much as that with an insulating dewar. This increased voltage signifies the influence of the distributed capacitance between the coil and the dewar.
DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-31066*# Man-Acoustics and Noise, Inc., Seattle, Wash.

A STUDY OF GENERAL AVIATION COMMUNITY NOISE IMPACT AND ANNOYANCE Final Contractor Report, Sep. 1979 - Apr. 1982

J. E. Mabry Apr. 1982 45 p refs
(Contract NAS1-15896)
(NASA-CR-165945; NAS 1.26:165945; MAN-1045) Avail: NTIS HC A03/MF A01 CSCL 20A

The method involved the selection of three airports which were dominated by aircraft weighing 12,500 lbs or under and which were also undergoing a change relative to utilization. Also, there was interest in airports with different utilization levels so that effect of number of operations could be considered. In addition, there was a requirement to select airports with communities in the surrounding areas which were exposed to aircraft operations noise. Noise annoyance response data was obtained from available sources. These sources included environmental impact statements, interviews with airport managers, noise complaint information, community meetings concerned with projected changes in airport utilization, and social survey data. As a means of objectively assessing the noise impact due to aircraft operations, noise measurement and computer noise modeling determinations were obtained for each airport. Listening quality tape recordings were also obtained. Author

N82-31067*# Dynamics Technology, Inc., Torrance, Calif.

RESEARCH ON THE NOISE PRODUCED BY LARGE SCALE STRUCTURE IN SUPERSONIC JETS Final Report, 1 Mar. 1981 - 30 Jun. 1982

Dennis K. McLaughlin and David G. Lilley (Oklahoma State Univ.) 30 Jun. 1982 117 p refs
(Contract NAG1-159)
(NASA-CR-169256) Avail: NTIS HC A06/MF A01 CSCL 20A

Using a dual electrode glow discharge excitation device, a method of mode selection into either the n = 0 or n = + or - 1 azimuthal modes was developed and tested by Fourier analyzing experimental azimuthal phase and amplitude data. On ε M = 2.1 moderate Reynolds number (Re = 68,000) jet with a laminar boundary layer, under n = 0 or n = +1 excitation, coherent axial wave evolution, mean flow, and sound pressure level directivity measurements were performed. The boundary layer of this same jet was excited usng a grit coating on the nozzle wall, and bandpassed axial wave evolution data obtained and compared to the masurements made by previous workers on a conventional high Reynolds number jet (Re = 5,000,000) using a hot-film type probe. Author

N82-31068*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

FINITE ELEMENT-INTEGRAL SIMULATION OF STATIC AND FLIGHT FAN NOISE RADIATION FROM THE JT15D TURBOFAN ENGINE

Kenneth J. Baumeister and Scott J. Horowitz (Lockheed-Georgia, Marietta) 1982 16 p refs Presented at the Winter Ann. Meeting of the Am. Soc. of Mech. Engr., Phoenix, Ariz.,

14-19 Nov. 1982
(NASA-TM-82936; E-1332; NAS 1.15:82936) Avail: NTIS HC A02/MF A01 CSCL 20A

An iterative finite element integral technique is used to predict the sound field radiated from the JT15D turbofan inlet. The sound field is divided into two regions: the sound field within and near the inlet which is computed using the finite element method and the radiation field beyond the inlet which is calculated using an integral solution technique. The velocity potential formulation of the acoustic wave equation was employed in the program. For some single mode JT15D data, the theory and experiment are in good agreement for the far field radiation pattern as well as suppressor attenuation. Also, the computer program is used to simulate flight effects that cannot be performed on a ground static test stand. Author

N82-31069*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NOISE TRANSMISSION LOSS OF AIRCRAFT PANELS USING ACOUSTIC INTENSITY METHODS
Michael C. McGary Aug. 1982 37 p refs
(NASA-TP-2046; L-15306; NAS 1.60:2046) Avail: NTIS HC A03/MF A01 CSCL 20A

The two-microphone, cross-spectral, acoustic intensity measurement technique was used to determine the acoustic transmission loss of three different aircraft panels. The study was conducted in the transmission loss apparatus in the Langley aircraft noise reduction laboratory. Author

N82-31070*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AIRPORT/COMMUNITY NOISE
David G. Stephens, comp. 1982 40 p Proceedings of a Workshop held at Hampton, Va., 25-26 Feb. 1982
(NASA-CP-2241; L-1545; NAS 1.55:2241) Avail: NTIS HC A03/MF A01 CSCL 13B

Airport noise and community planning for noise compatibility were discussed. For individual titles, see N82-31071 through N82-31074.

N82-31071*# Douglas Aircraft Co., Inc., Long Beach, Calif.
AIRPORT NOISE
Robert E. Pendley *In* NASA. Langley Research Center Airport/Community Noise 1982 p 2-12 (For primary document see N82-31070 21-71)
Avail: NTIS HC A03/MF A01 CSCL 13B

The problem of airport noise at several airports and air bases is detailed. Community reactions to the noise, steps taken to reduce jet engine noise, and the effect of airport use restrictions and curfews on air transportation are discussed. The adverse effect of changes in allowable operational noise on airport safety and altenative means for reducing noise pollution are considered. Community-airport relations and public relations are discussed. J.D.

N82-31072*# Georgia Inst. of Tech., Atlanta.
COMMUNITY NOISE
Clifford R. Bragdon *In* NASA. Langley Research Center Airport/Community Noise 1982 p 13-29 (For primary document see N82-31070 21-71)
Avail: NTIS HC A03/MF A01 CSCL 13B

Airport and community land use planning as they relate to airport noise reduction are discussed. Legislation, community relations, and the physiological effect of airport noise are considered. Noise at the Logan, Los Angeles, and Minneapolis/St. Paul airports is discussed. J.D.

N82-31073*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SUMMARY OF AIRPORT TECHNOLOGY NEEDS
Homer G. Morgan *In its* Airport/Community Noise 1982 p 30 (For primary document see N82-31070 21-71)
Avail: NTIS HC A03/MF A01 CSCL 13B

The need for improvement in airport noise assessment methodology is summarized and specific investigations of the relationship between noise level and individual and community response outlined. J.D.

N82-31074*# Georgia Inst. of Tech., Atlanta.
SUMMARY OF COMMUNITY TECHNOLOGY NEEDS
Clifford R. Bragdon *In* NASA. Langley Research Center Airport/Community Noise 1982 p 31-33 (For primary document see N82-31070 21-71)
Avail: NTIS HC A03/MF A01 CSCL 13B

Applications of the social sciences and engineering to solution of the problem of airport noise are summarized. Specific needs are outlined. J.D.

N82-31075# Pennsylvania State Univ., University Park. Applied Research Lab.
EXPERIMENTAL METHOD TO MEASURE LOW FREQUENCY SOUND RADIATION: NEARFIELD ACOUSTICAL HOLOGRAPHY
William Y. Strong, Jr. 3 Feb. 1982 105 p refs
(Contract N00024-79-C-6043)
(AD-A114777; ARL/PSU/TM-82-71) Avail: NTIS HC A06/MF A01 CSCL 20/1

A technique called Nearfield Acoustical Holography (NAH) has been developed. The technique, a significant improvement over conventional holography, is not subject to the wavelength resolution limitation associated with conventional techniques. An exact formulation of the Green's function propagator allows reconstructions of the entire pressure, particle velocity, and vector intensity fields. The vector intensity may be plotted to show the flow of acoustic energy around and away from a source. On some sources, these mappings reveal areas of non-radiating, circulating energy flow. These areas may have large pressure or velocity amplitudes and negative intensity regions that previously led to misconceptions about the production of acoustic energy. GRA

N82-31076# Brown Univ., Providence, R. I. Center for Dynamical Systems.
ROBUSTNESS AND APPROXIMATION OF ESCAPE TIMES AND LARGE DEVIATIONS ESTIMATES FOR SYSTEMS WITH SMALL NOISE EFFECTS
Harold J. Kushner Mar. 1982 49 p refs
(Contract N00014-76-C-0279; Grants AF-AFOSR-0116-81; NSF ENG-77-12946)
(AD-A115434; LCDS-82-5) Avail: NTIS HC A04/MF A01 CSCL 20/01

For the purposes of estimating escape time from a given set, or other statistical properties of systems with small noise effects, it is generally assumed in applications that the system noise is white Gaussian. The Gaussian assumption greatly simplifies the computation, but is not adequate for many important classes of applications to control and communication theory. For example, when the noise is small, the mean escape time from a set can be quite sensitive to the underlying statistics even though in the study of the effects of the noise over any fixed finite time interval, the Gaussian approximation might be a good one. This paper is concerned with the sensitivity of these statistical quantities to the underlying statistical structure, when the noise effects are small, and also with the question of when the Gaussian assumption makes sense. GRA

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-31077*# Battelle Columbus Labs., Ohio.
QUANTUM CHEMICAL CALCULATION OF THE EQUILIBRIUM STRUCTURES OF SMALL METAL ATOM CLUSTERS
Final Progress Report
Luis R. Kahn 11 Aug. 1982 83 p refs
(Grant NsG-2027)
(NASA-CR-169250; NAS 1.26:169250) Avail: NTIS HC A05/MF A01 CSCL 20H

Metal atom clusters are studied based on the application of ab initio quantum mechanical approaches. Because these large 'molecular' systems pose special practical computational problems in the application of the quantum mechanical methods, there is

a special need to find simplifying techniques that do not compromise the reliability of the calculations. Research is therefore directed towards various aspects of the implementation of the effective core potential technique for the removal of the metal atom core electrons from the calculations. S.L.

N82-31078*# Stanford Univ., Calif. Lab. of Physics.
ULTRA HIGH RESOLUTION MOLECULAR BEAM CARS SPECTROSCOPY WITH APPLICATION TO PLANETARY ATMOSPHERIC MOLECULES Final Technical Report, 1 Jan. 1980 - 30 Jun. 1982
Robert L. Byer Jul. 1982 46 p refs
(Contract NCC2-50; Grant NSF CHE-79-12673)
(NASA-CR-169252; NAS 1.26:169252; GL-3458) Avail: NTIS HC A03/MF A01 CSCL 20H

The measurement of high resolution pulsed and continuous wave (CW) coherent anti-Stokes Raman spectroscopy (CARS) measurements in pulsed and steady state supersonic expansions were demonstrated. Pulsed molecular beam sources were characterized, and saturation of a Raman transition and, for the first time, the Raman spectrum of a complex molecular cluster were observed. The observation of CW CARS spectra in a molecular expansion and the effects of transit time broadening is described. Supersonic expansion is established as a viable technique for high resolution Raman spectroscopy of cold molecules with resolutions of 100 MH2. J.D.

N82-31079# Puerto Rico Univ., Rio Piedras. Dept. of Physics.
ON PERFECT SCREENING FOR CHARGED SYSTEMS
L. Blum, C. Gruber (Ecole Polytechnique Federale, Lausanne, Switzerland), J. Lebowitz (Rutgers Univ., New Brunswick, N.J.), and P. Martin (Ecole Polytechnique Federale, Lausanne, Switzerland) 20 Apr. 1982 12 p refs
(Contract N00014-81-C-0776; Grants NSF CHE-80-01969; AF-AFOSR-0015-82; NR Proj. 051-775)
(AD-A114631) Avail: NTIS HC A02/MF A01 CSCL 20/9

We prove that when correlations in an equilibrium classical system in v-dimensions, v greater than or equal, containing charges decay faster than (distance)-(l+v) then the charge cloud surrounding particles has no multipole moments of order k less than or equal. This yields l+1 sum rules with 1 equal infinity when the decay is exponential. This extends previous results for 1 less than or equal 2 sum rules and also generalizes them to systems containing fixed dipoles (or higher multipoles). Some consequences are described. GRA

N82-31080# New Mexico Univ., Albuquerque. Dept. of Physics and Astronomy.
OPTIMAL CONTROL OF THE INTERMEDIATE ENERGY TO DISSOCIATION LIMIT RANGE Final Technical Report, 1 Oct. 1976 - 30 Sep. 1981
J. Eldon Steelman 30 Sep. 1981 17 p refs
(Grant AF-AFOSR-3132-77; AF Proj. 2301)
(AD-A114927; AFOSR-82-0387TR) Avail: NTIS HC A02/MF A01 CSCL 20/8

To permit more reliable description of diatomic molecule properties in high-energy, high-temperature environments, new functional forms have been proposed for both vibrational energy levels and potentials. These incorporate near-dissociation as well as near-equilibrium characteristics. The energy level expression was applied with considerable success to six electronic states; these include ground states of hydrogen species and excited states of molecular bromine and iodine. Use of the proposed eigenvalue representation reduced errors in RKR turning-point separations by two or three orders of magnitude, very near dissociation. Rational fraction representation of potentials was attempted for eight diatomic electronic states. The eight prototype potentials offer a diversity of forms. For all eight the rational fractions yielded very high levels of accuracy. Generally a single fraction was applicable over a wide range of nuclear separations, for example, from one-half to fifty angstroms. GRA

N82-31081# Princeton Univ., N. J. Dept. of Chemical Engineering.
PHOTOIONIZATION OF MOLECULAR CLUSTERS Final Report, 1 May 1978 - 30 Sep. 1981
Ronald P. Andres and Joseph M. Calo Dec. 1981 53 p refs
(Grant AF-AFOSR-3638-78; AF Proj. 2303)
(AD-A115149; AFOSR-82-0451TR) Avail: NTIS HC A04/MF A01 CSCL 07/4

An experimental apparatus consisting of a novel multiple expansion cluster source coupled with a molecular beam system and photoionization mass spectrometer has been designed and constructed. This apparatus has been thoroughly tested and preliminary measurements of the growth kinetics of water clusters and the photoionization cross section of the water dimer have been carried out. Author (GRA)

N82-31082# Experimental and Mathematical Physics Consultants, Santa Monica, Calif.
ELECTRON DOSE ATTENUATION KERNELS FOR SLAB AND SPHERICAL GEOMETRIES Final Report
T. M. Jordan Kirtland AFB, N. Mex. AFWL Nov. 1981 120 p refs
(Contract F29650-78-M-2320; AF Proj. 8809)
(AD-A115232; AFWL-TR-81-43) Avail: NTIS HC A06/MF A01 CSCL 20/8

Dose attenuation kernels are given for fission spectrum electrons in aluminum shields with slab and spherical geometries. Sectoring methods used for satellites and space vehicles are discussed and several mathematical relationships are summarized. Dose attenuation data for monoenergetic electrons are presented for several shield materials and geometrics. Author (GRA)

N82-31083# Colorado State Univ., Fort Collins. Dept. of Chemistry.
OsF6 ENERGY LEVELS AND VIBRONIC COUPLING IN THE (dt2g)2 CONFIGURATION
D. L. Michalopoulos and E. R. Bernstein 2 Feb. 1982 57 p
(Contract N00014-79-C-0647)
(AD-A115474; TR-6) Avail: NTIS HC A04/MF A01 CSCL 20/8

Electronic and vibronic energy levels of the (d sub 2 sub tg)-squared configuration of OsF6 are studied using electronic Raman scattering and absorption spectroscopy. The ground state has been identified as E sub g (crystal field split by approx. 28/cm) and the first excited state is T sub lg with crystal field energy levels at 14, 28 and 40/cm. The three other regions of the spectrum that were observed are at 4,000/cm, 8,000/cm, and 17,000/cm covering the remaining (d sub 2 tg)-squared configuration levels. The 4,000/cm band consists of A sub lg and T sub lg electron states which do not interact strongly through vibronic coupling. The T sub lg electronic state evidences a strong approx. (D 2.2) linear Jahn Teller effect for Nu sub 5 and an observable Jahn Teller effect for Nu sub 2. The band at 8,000/cm consists of E sub g and T sub 2g electronic states; it is so complex and strongly coupled that little information can be extracted from the absorption data concerning the Jahn-Teller interaction in this 5-fold degenerate manifold. The feature at 17,000/cm is an A sub lg electronic state and its elucidation follows normal behavior found in other hexafluoride spectra.
Author (GRA)

N82-31084# Colorado State Univ., Fort Collins. Dept. of Chemistry.
MOLECULAR AGGREGATES IN CRYOGENIC SOLUTIONS
M. W. Schauer, J. Lee, and E. R. Bernstein 7 Jul. 1981 25 p refs Submitted for publication
(Contract N00014-79-C-0647)
(AD-A115490; TR-5) Avail: NTIS HC A02/MF A01 CSCL 20/8

In this report, experimental procedures and results concerning the study of aggregates are presented. Absorption spectra of solutions of the following solutes and solvents have been studied: pyrazine/C3H8; benzene/NF3, C3H8, N2, CO, CF4; and osmium tetroxide/NF3, CH4, C3H8. In order to obtain some qualitative estimation of aggregate size light scattering experiments were also performed on solutions of pyrazine/C3H8, benzene/CF4 benzene/NF3, and benzene/C3H8. The nature of these non-equilibrium molecular clusters in solution will be addressed. Author (GRA)

N82-31085# Texas Univ., Austin. Dept. of Physics.
COLLABORATION ON MEDIUM ENERGY MEASUREMENTS OF N-N PARAMETERS Progress Report, 1 Jan. - 31 Dec. 1981

1981
Dec. 1981 52 p refs
(Contract DE-AS05-81ER-40030)
(DE82-006800; DOE/ER-40030/1) Avail: NTIS HC A04/MF A01

Research in medium energy physics at LAMPF during 1981 is summarized. It principally involves determining medium energy nucleon-nucleon scattering amplitudes in both elastic and inelastic collisions. DOE

N82-31086# Wien Univ. (Austria). Inst. fuer Theoretische Physik.
SUPERSYMMETRIC DIRAC PARTICLES IN RIEMANN-CARTAN SPACE-TIME
H. Rumpf 1981 27 p refs
(UWThPh-81-6) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

A nontrivial coupling of classical spinning particles to torsion in a Riemann-Cartan geometry is examined. The equations of motion implied by the model coincide with a consistent classical limit of the Heisenberg equations derived from the minimally coupled Dirac equation. It is shown that the latter equation arises from canonical quantization of the classical system. The Heisenberg equations are obtained exact in all powers of h/2(LC OMEGA) and thus complete the partial results of previous WKB calculations. The mathematical realization of anticommuting variables, the physical interpretation of supersymmetry transformations, and the effective variability of rest mass are also considered. DOE

N82-31087# Los Alamos Scientific Lab., N. Mex.
CORRECTION FOR GAMMA-RAY SELF-ATTENUATION IN REGULAR HETEROGENEOUS MATERIALS
J. L. Parker Sep. 1981 11 p refs
(Contract W-7405-eng-36)
(DE82-001888; LA-8987-MS) Avail: NTIS HC A02/MF A01

A procedure for determining the total correction factor for gamma-ray self-attenuation in regular heterogeneous materials is derived and discussed. The result of a practical application of the procedure to the passive gamma-ray assay of the 235U content of high-temperature gas reactor fuel is presented. DOE

N82-31088# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
POTENTIAL DETERMINATION FOR ELECTRONICALLY EXCITED ALKALI-NOBLE GAS COLLISION SYSTEMS Thesis [POTENTIALBESTIMMUNG FUER ELEKTRONISCH ANGEREGTE ALKALI-EDELGAS-STOSSSYSTEME]
Eckart Hasselbrink Nov. 1981 83 p refs In GERMAN
(MPIS-19/1981; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,45

Model potential calculation for alkali-noble gas collision systems were performed. The model potential includes the dipole-quadrupole interaction and has two parameters. For the system, Na-Ar, a simultaneous reproduction of ground state cross section and potential well depth of the excited state is obtained. A comparison with spectroscopic investigations shows an error in equilibrium distances and potential form. For the system K-Ar the potential of the first excited state measured differential cross section is adapted and the known ground state potential data are reproduced. Potentials were also calculated for other systems. Different methods, to determine coupling matrix and channels taken into consideration by close-coupling calculations for excited states, were compared. The differences of the rainbow maximum position are smaller than 5% for normal potentials and larger for extreme potentials. Author (ESA)

N82-31089# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
CONSTRUCTION OF A MOLECULAR BEAM APPARATUS FOR SCATTERING MOLECULAR BEAMS OF SINGLE CRYSTAL SURFACES. SELECTIVE ADSORPTION AND DESORPTION OF HELIUM ON A LiF (001)-SURFACE Thesis [AUFBAU EINER DUESENSTRAHLAPPARATUR ZUR STREUUNG VON MOLEKULARSTRAHLEN AN EINKRISTALLOBERFLAECHEN. SELEKTIVE ADSORPTION UND DESORPTION VON HELIUM AN EINER (001)-OBERFLAECHE VON LITHIUM-FLUORID]
Gerhard Lilienkamp Nov. 1981 120 p refs In GERMAN
(MPIS-18/1981; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,80

An He molecular beam apparatus was constructed in order to investigate scattering on single crystal surfaces. The beam source can be coded by liquid nitrogen. Wave vectors of 5.8 A (17.6meV) are obtained. Scattered particles are detected by a magnetic mass spectrometer. The sum of incidence and scattering angle can be continuously varied between 50 deg and 180 deg. Angular resolution is 0.1 deg. Besides the diffraction maxima, maxima and minima attributed to selective adsorption and ensuing desorption after inelastic collision with a photon, are analyzed. Energy resolved time of flight measurement is demonstrated. Some photons involved in collisions are identified. Author (ESA)

N82-31090# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
CONSTRUCTION OF A MOLECULAR BEAM APPARATUS TO MEASURE THE INTEGRAL CROSS SECTIONS OF HIGHLY VIBRATION EXCITED MOLECULES Thesis [AUFBAU EINER MOLEKULARSTRAHLAPPARATUR ZUR MESSUNG INTEGRALER QUERSCHNITTE HOCH SCHWINGUNGSANGEREGTER MOLEKUELE]
Manfred Fuchs Jan. 1982 130 p refs In GERMAN
(MPIS-2/1982; ISSN-0436-1199) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22,50

A molecular beam apparatus which measures integral cross sections of highly vibration excited LiD and Li2 molecules was examined. The LiD and Li2 molecules are produced in a radiation heated single chamber oven, optimizing the intensity of the stable molecular beam. The molecules are excited with an argon ion laser. The measured Li2 fluorescent angular spectra are reproduced within the error bars using a simple model which determines the absolute transition wave numbers up to about + or - 0.005 cm and the velocity distribution of the molecular beam. Author (ESA)

N82-31091# Kernforschungsanlage, Juelich (West Germany). Zentralbibliothek.
SUMMARY OF NEUTRON SCATTERING LENGTHS
L. Koester (Reaktorstation Garching, West Germany), H. Rauch (Vienna Univ.), M. Herkens, and K. Schroeder Dec. 1981 121 p refs
(Contract IAEA-2517/RB)
(JUEL-1755; ISSN-0366-0885) Avail: NTIS HC A06/MF A01

All available neutron-nuclei scattering lengths are presented together with their error bars. Bound scattering lengths are given for the elements, the isotopes and the various spin states. They are discussed in the sense of their use as basic parameters for many investigations in the field of nuclear and solid state physics. Recommended values and a map of these data serve for the uncomplicated use of these quantities. Author (ESA)

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-31092 Academy of Sciences (USSR), Moscow. Space Research Inst.
ENERGETIC PROTON BURSTS DURING MAGNETIC ISLANDS FORMATION IN THE EARTH'S MAGNETOTAIL
L. M. Zeleny, A. S. Lipatov, D. G. Lominadze, and A. L. Taktakishvili 1982 37 p refs
(PR-697) Copyright. Avail: Issuing Activity

The time dynamics of particle acceleration that occurs in the course of the reconstruction of the magnetic field configuration in the magnetotail current layer is considered. The formation of the energy spectra in the magnetospheric tail is discussed. The

results of analytical calculations and numerical simulation are discussed in relation with the experimental data obtained on IMP 7 and 8 satellites. The energetic spectra data is emphasized. The comparison with the other experimentally obtained features of the acceleration process (data on anisotropy, angular distribution, source motion) is included. S.L.

N82-31093# Sandia Labs., Albuquerque, N. Mex.
BIOLOGICAL AND RELATED CHEMICAL RESEARCH CONCERNING SUBSEABED DISPOSAL OF HIGH LEVEL NUCLEAR WASTE
Michael M. Mullin and Leo S. Gomez Oct. 1981 38 p Presented at the Workshop held at Jackson Hole, Wyo., 12-16 Jan. 1981 Prepared in cooperation with Scripps Institution of Oceanography
(Contract DE-AC04-76DP-00789)
(DE82-003908; SAND-81-0012) Avail: NTIS HC A03/MF A01

This report contains: recommendations (research on radionuclide movement processes, research on radionuclide transport processes, administration and policy); abstracts of plenary talks (Large-Scale Distributions of Deep-Sea Benthic Organisms, Transfer Processes Between Water Column and Benthos, Particle Reworking and Biogeochemistry of Sediments, and radioecological Aspects of Deep-Sea Waste Disposal of Radionuclides. Summaries of subgroup discussions (geochemistry and microbiology, benthic biology, pelagic biology, radioecology); and appendices (model of physical biological transfers, and participants and institutional affiliations) are also presented. DOE

N82-31094# Pacific Northwest Lab., Richland, Wash.
REFERENCE COMMERCIAL HIGH-LEVEL WASTE GLASS AND CANISTER DEFINITION
S. C. Slate, W. A. Ross, and W. L. Partain Sep. 1981 103 p refs
(Contract DE-AC06-76RL-01830)
(DE82-001503; PNL-3838) Avail: NTIS HC A06/MF A01

Technical data and performance characteristics of a high level waste glass and canister intended for use in the design of a complete waste encapsulation package suitable for disposal in a geologic repository are presented. The borosilicate glass contained in the stainless steel canister represents the probable type of high level waste product that is produced in a commercial nuclear-fuel reprocessing plant. Development history is summarized for high level liquid waste compositions, waste glass composition and characteristics, and canister design. The decay histories of the fission products and actinides (plus daughters) calculated by the ORIGEN-II code are presented. DOE

N82-31095# United Kingdom Atomic Energy Authority, Harwell (England). Chemical Technology Div.
DEVELOPMENT OF A STRATEGY FOR THE MANAGEMENT OF HIGH LEVEL RADIOACTIVE WASTES
H. Beale Jul. 1981 35 p refs
(DE81-700545; AERE-R-10178) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

An assessment is made of the options available for the management of high level radioactive wastes. It is concluded that the high active liquor should be vitrified at the earliest possible date and points to the advantages of storing the vitrified waste for an extended period in reinforced concrete casks. DOE

N82-31096# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho. Waste Programs Div.
SOLID WASTE INFORMATION MANAGEMENT SYSTEM (SWIMS). DATA SUMMARY, FISCAL YEAR 1980
H. M. Batchelder May 1981 180 p
(Contract DE-AC07-76ID-01570)
(DE82-005250; DOE/TIC-2005250; IDO-10086(80)) Avail: NTIS HC A09/MF A01

The solid waste information management system (SWIMS) maintains computerized records on a master data base. It provides a comprehensive system for cataloging and assembling data into output reports. The SWIMS data base contains information on the transuranic (TRU) and low level waste (LLW) generated, buried, or stored. DOE

N82-31097# Oak Ridge National Lab., Tenn. Hazardous Materials Information Center.
LOW-LEVEL RADIOACTIVE WASTE TECHNOLOGY: A SELECTED, ANNOTATED BIBLIOGRAPHY, VOLUME 3
C. S. Fore, R. F. Carrier, R. H. Brewster, L. K. Hyder, and K. A. Barnes Oct. 1981 248 p
(Contract W-7405-eng-26)
(DE82-001841; ORNL/EIS-133-Vol-3) Avail: NTIS HC A11/MF A01

Focuses on disposal site, environmental transport, and waste treatment studies as well as general reviews on the subject of low level radioactive wastes both domestic and foreign literature for the period 1951 to 1981 is covered. Environmental transport, general studies and reviews, geology, hydrology, and site resources, regulatory and economic aspects, social aspects, and transportation technology are some of the topics covered. DOE

N82-31098# Oak Ridge National Lab., Tenn.
OVERVIEW OF MILESTONE E ACTIVITIES, GREATER CONFINEMENT THAN SHALLOW LAND BURIAL
Lance J. Mezga 1981 10 p refs Presented at the 3rd Ann. DOE Participants Inform. Meeting on Low-Level Waste Management, New Orleans, 4 Nov. 1981
(Contract W-7405-eng-26)
(DE82-002785; CONF-811130-6) Avail: NTIS HC A02/MF A01

The objective of Milestone E is to provide the technology and documentation needed to open a site providing greater confinement than shallow land burial. To that end, greater confinement disposal, options for achieving it, and the need for this disposal technology were studied. The full range of options to shallow land burial were studied. It was decided to focus on a combination of greater depth solidification containment and engineered barriers. A series of research needs were identified and the efforts focused on resolving those needs. DOE

N82-31099# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
SHALLOW-LAND-BURIAL HANDBOOK
W. J. Boegly, Jr. and E. C. Davis 1981 7 p Presented at the 3rd Ann. DOE Participants Inform. Meeting on Low-Level Waste Management, New Orleans, 4 Nov. 1981
(Contract W-7405-eng-26)
(DE82-002811; CONF-811130-9) Avail: NTIS HC A02/MF A01

Low level waste disposal, the legal and institutional problems that are involved in developing and licensing a facility, and the considerations and data needs for siting, designing, operating, and closing a facility are discussed. The types of actions that must be considered and the types of information required to achieve successful operations are illustrated. DOE

N82-31100# Los Alamos Scientific Lab., N. Mex. Environmental Science Group.
BIOLOGICAL INTRUSION OF LOW-LEVEL-WASTE TRENCH COVERS
Thomas E. Hakonson and Ernest S. Gladney 1981 6 p refs Presented at the Ann. Meeting of the Mater. Res. Soc., Boston, 17-19 Nov. 1981
(Contract W-74-5-eng-36)
(DE82-002397; LA-UR-81-2972; CONF-811122-11) Avail: NTIS HC A02/MF A01

The long-term integrity of low-level waste shallow land burialsites is dependent on the interaction of physical, chemical, and biological factors that modify the waste containment system. The need to consider biological processes as being potentially important in reducing the integrity of waste burial site cover treatment is demonstrated. One approach to limiting biological intrusion through the waste cover is to apply a barrier within the profile to limit root and animal penetration with depth. Experiments in the Los Alamos Experimental Engineered Test Facility were initiated to develop and evaluate biological barriers that are effective in minimizing intrusion into waste trenches. The experiments that are described employ four different candidate barrier materials of geologic origin. Experimental variables that will be evaluated, in addition to barrier type, are barrier depth and soil overburden depth. DOE

N82-31101# National Center for Resource Recovery, Washington, D. C.

PROPOSED DRAFT DOCUMENT FOR GSA OFFICE WASTE REMOVAL AND PROCUREMENT OF DENSIFIED REFUSE DERIVED FUEL FOR USE AS A SUPPLEMENTAL FUEL IN GAS OPERATED BOILERS

J. A. Campbell Sep. 1981 90 p refs Sponsored in part by Army

(Contract DE-AC01-76CS-20167)

(DE82-002000; DOE/CS-20167-8) Avail: NTIS HC A05/MF A01

A contract specifying waste collection and disposal from buildings managed by Government Services Administration (GSA) in the Washington, D. C. area and the production and delivery of pelletized fuel for burning with coal in one or two GSA steam generating plants is given. DOE

N82-31102# Argonne National Lab., Ill. Chemical Engineering Div.

FUEL CYCLE PROGRAMS Quarterly Progress Report, Oct. - Dec. 1980

M. J. Steindler, Seymour Vogler, G. F. Vandegrift, Jacqueline Williams, T. J. Gerding, L. J. Jardine, J. K. Bates, J. E. Kincinas, W. J. Mecham, and R. H. Pelto Jul. 1981 103 p refs

(Contract W-31-109-eng-38)

(DE82-003237; ANL-81-13) Avail: NTIS HC A06/MF A01

Waste forms studied include fused salt, calcined sludge mixed with anhydrous silicates, and pellets made from Fe_2O_3 and aqueous silicate solutions. Leach rate measurements were continued, using tracer and activation techniques and the leach resistance of several waste forms was tested. Work on the impact resistance of brittle waste forms included additional tests with Pyrex specimens. In simulations of a hydraulic breach of a nuclear waste repository located in bedded salt, experiments were performed to study brine flow through rock salt. Logging techniques are being developed to measure the relative amount of residual oil in a depleted oil reservoir. Distribution coefficients of Cs(+) between kaolinite and 0.1M $NaHCO_3$ solutions are being measured. Equipment for the destructive analysis of full length irradiated fuel rods from the LWBR are being developed in support of the LWBR Proof of Breeding Project. DOE

N82-31103# Battelle Human Affairs Research Centers, Seattle, Wash.

RISK PERCEPTION, RISK EVALUATION AND HUMAN VALUES: COGNITIVE BASES ACCEPTABILITY OF A RADIOACTIVE WASTE REPOSITORY

T. C. Earle, Michael K. Lindell, William L. Rankin, and S. M. Nealey Jul. 1981 100 p refs

(Contract DE-AC06-76RL-01830)

(DE82-001044; PNL-3798; BHARC-411/81/007) Avail: NTIS HC A05/MF A01

Public acceptance of radioactive waste management alternatives depends in part on public perception of the associated risks. Three aspects of those perceived risks were explored: (1) synthetic measures of risk perception based on judgments of probability and consequences; (2) acceptability of hypothetical radioactive waste policies; and (3) effects of human values on risk perception. Both the work on synthetic measures of risk perception and on the acceptability of hypothetical policies included investigations of three categories of risk: short term public risk (affecting persons living when the wastes are created), long term public risk (affecting persons living after the time the wastes were created), and occupational risk (affecting persons working with the radioactive wastes). The human values work related to public risk perception in general, across categories of persons affected. Respondents were selected according to a purposive sampling strategy. DOE

N82-31104# General Atomic Co., San Diego, Calif.

HIGH-TEMPERATURE GAS-COOLED REACTOR FOR PROCESS-HEAT APPLICATIONS

R. N. Quade and C. F. McDonald Jul. 1981 12 p refs Presented at the ASME Winter Ann. Meeting, Washington, D.C., 11-15 Nov. 1981

(Contract DE-AT03-76SF-70046)

(DE81-029133; GA-A-16395; CONF-811101-8) Avail: NTIS HC A02/MF A01

The high temperature gas cooled reactor (HTGR) offers a unique heat source for process heat applications because its operating temperature is substantially higher than operating temperatures of other nuclear reactor types. The HTGR is being evaluated for reactor core outlet temperatures of 750, 850, and 950 C. The 750 C nuclear heat surce design represents one that can be used in a near term deployment strategy and can be coupled to a variety of process heat applications. The 850 C design allows an even larger penetration into the process heat market and can be applied to a number of processes for the production of synthetic fuels. The longer term HTGR design with outlet coolant temperatures of 950 C and above permits the attainment of the full potential of the HTGR as a heat source. A transitional deployment strategy for the various HTGR designs is described. DOE

N82-31105# Sandia Labs., Albuquerque, N. Mex. Seabed Programs Div.

PROGRAM CRITERIA FOR SUBSEABED DISPOSAL OF RADIOACTIVE WASTE: RESEARCH STRATEGIES AND REVIEW PROCESSES

Sep. 1981 20 p refs

(Contract DE-AC04-76DP-00789)

(DE82-001962; SAND-80-2384) Avail: NTIS HC A02/MF A01

The Subseabed Disposal Program follows the policies and criteria of the National Waste Terminal Storage program for the development of land-based repositories, except where the technical differences between land and ocean geologic disposal make different approaches or criteria necessary. This is the first of a series of documents describing the procedures and criteria for the Subseabed Disposal Program. DOE

N82-31106# Joint Research Centre of the European Communities, Ispra (Italy).

EXPERIMENTAL INVESTIGATION OF THE ENTHALPY AND MASS FLOW DISTRIBUTION IN 16-ROD CLUSTERS WITH BWR-PWR GEOMETRIES AND CONDITIONS Final Report

H. Herkenrath, W. Hufschmidt, U. Jung, and F. Weckermann 1981 252 p refs Submitted for publication Sponsored by Comitato Nazionale per l'Energie Nucleare and Bundesministerium fuer Forschung und Technologie

(EUR-7575-EN) Avail: NTIS HC A12/MF A01

Enthalpy and mass flow distribution at the outlet of two test sections with uniform heating in axial and radial direction under steady state conditions was measured by simultaneous sampling of five of six characteristic subchannels in the bundle, using the isokinetic technique and analyzing the outlet quantities by a calorimetic method. Results show low steam quality for the corner subchannel under BWR conditions, due to a thick liquid film on the unheated channel wall. Experimental data confirm the usefullness of the subchannel sampling technique for understanding thermohydraulic phenomena under two-phase flow conditions in multirod bundles. Subchannel resistance coefficients for both types of spacers under one-phase flow conditions were calculated by a substructure method, showing a high local value of the corner subchannel. Total resistance of the spacer was evaluated using local drag coefficients. It agrees well with measured values under adiabatic conditions. Author (ESA)

N82-31107# Joint Research Centre of the European Communities, Ispra (Italy)

PROPAGATION OF UNCERTAINTIES IN THE RESPONSE OF A PRESSURIZED WATER REACTOR (PWR) PRIMARY PIPING MODEL TO SEISMIC LOADS

1981 63 p refs Submitted for publication

(EUR-7602-EN) Avail: NTIS HC A04/MF A01

The response surface method for investigating nuclear reactor system or components reaction to accidents is introduced. By assuming that the system simulated by computer codes behaves regularly, the transformation from code input to code output variables is approximated by a simple functional relationship (typically a polynomial) in a subspace which is contained in the set of input variables. The method was applied to the structural code STRUDL, used to compute the response of a PWR primary piping model subjected to seismic loads. The propagation of uncertainties of structural and seismic input variables was analyzed, and probability estimates of the piping maximum stress

were computed. Results show that the piping is capable of resisting earthquakes and that peak wave acceleration is the dominant response factor. Author (ESA)

74 OPTICS

Includes light phenomena.

N82-31108*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN APPLICATION OF THE BRAUNBECK METHOD TO THE MAGGI-RUBINOWICZ FIELD REPRESENTATION
Robert Meneghini Jun. 1982 24 p refs Submitted for publication
(NASA-TM-83949; NAS 1.15:83949) Avail: NTIS HC A02/MF A01 CSCL 20F

The Braunbek method is applied to the generalized vector potential associated with the Maggi-Rubinowicz representation. Under certain approximations, an asymptotic evaluation of the vector potential is obtained. For observation points away from caustics or shadow boundaries, the field derived from this quantity is the same as that determined from the geometrical theory of diffraction on a singly diffracted edge ray. An evaluation of the field for the simple case of a plane wave normally incident on a circular aperture is presented showing that the field predicted by the Maggi-Rubinowicz theory is continuous across the shadow boundary. M.G.

N82-31109*# Ball State Univ., Muncie, Ind. Dept. of Physics and Astronomy.
SOLAR CONCENTRATION PROPERTIES OF FLAT FRESNEL LENSES WITH LARGE F-NUMBERS Final Report
Ronald M. Cosby Mar. 1978 35 p refs
(Contract NCA8-129)
(NASA-CR-162050; NAS 1.26:162050) Avail: NTIS HC A03/MF A01 CSCL 20F

The solar concentration performances of flat, line-focusing sun-tracking Fresnel lenses with selected f-numbers between 0.9 and 2.0 were analyzed. Lens transmittance was found to have a weak dependence on f-number, with a 2% increase occuring as the f-number is increased from 0.9 to 2.0. The geometric concentration ratio for perfectly tracking lenses peaked for an f-number near 1.35. Intensity profiles were more uniform over the image extent for large f-number lenses when compared to the f/0.9 lens results. Substantial decreases in geometri concentration ratios were observed for transverse tracking errors equal to or below 1 degree for all f-number lenses. With respect to tracking errors, the solar performance is optimum for f-numbers between 1.25 and 1.5. Author

N82-31110# Royal Military Coll. of Science, Shrivenham (England). Dept. of Physics.
MEASUREMENTS RELEVANT TO THE PERFORMANCE OF INFRARED OPTO-ELECTRONIC DEVICES IN FOG
M. R. Clay and A. P. Lenham Apr. 1981 8 p refs
(TN-PD-20/81; BR79452) Avail: NTIS HC A02/MF A01

The transmissivity of the atmosphere in the visible and infrared was measured in a number of fogs. The data is summarized in the form of tables and diagrams that indicate the gain in range that may be achievable in the various infrared windows. In some fogs there does not appear to be any significant advantage in using infrared devices. M.G.

N82-31111*# Bendix Corp., Mishawaka, Ind. Guidance Systems Div.
FIELD SUPPORT FOR SOLAR TRACKER Final Report
22 Jul. 1982 24 p refs
(Contract NAS8-34681)
(NASA-CR-162063; NAS 1.26:162063; Rept-5701-BLL-02-329) Avail: NTIS HC A02/MF A01 CSCL 20F

The objectives, preparation and analysis prior to test, test results, and closed loop analysis of the solar telescope gimbal and tracker system are discussed. N.W.

N82-31112# Stanford Univ., Calif. Lab. of Physics.
NEW APPROACHES TO OPTICAL SYSTEMS FOR INERTIAL ROTATION SENSING Interim Scientific Report, 1 Jan. - 31 Dec. 1980
M. Chodorow, C. C. Cutler, S. A. Newton, G. A. Pavlath, and H. J. Shaw Dec. 1981 96 p refs
(Contract F49620-80-C-0040; AF Proj. 2301)
(AD-A114753; SU-GL-3341; AFOSR-82-0217TR) Avail: NTIS HC A05/MF A01 CSCL 17/8

The objective of this research program has been to investigate the potential of new fiber optic configurations for inertial rotation sensing so as to extend the sensitivity and stability of such systems. In particular, the research has been aimed at the design and construction of reentrant Sagnac systems permitting recirculation of the optical signals. There have been two main activities in the program, (1) the design and partial construction of an all-fiber Sagnac rotation sensor eliminating all previously used bulk optical components, lenses, mirrors, prisms, etc. Bulk components do not have sufficient precision and impose alignment problems so as to limit the sensitivity and recirculation capability of Sagnac sensors. The all fiber design was made possible by the development in this laboratory pårtially under other contract support of a set of all fiber components, directional couplers, polarizers, and polarization controllers, which have been incorporated in the all fiber design. This configuration should provide greatly increased sensitivity and device compactness and ruggedness. The second set of activities in the program has been to investigate various limitations on the sensitivity (minimum detectable rotation rate) of Sagnac systems. One such limitation is the extraneous noise known to exist in all Sagnac systems. We have found particularly, that the effects of Rayleigh backscattering from fiber inhomogeneities of phase detection in Sagnac systems, as one of the principle limitations on sensitivity. GRA

N82-31113# Rome Air Development Center, Griffiss AFB, N.Y.
THE FEE, A NEW TUNABLE HIGH RESOLUTION SPECTRUM ESTIMATOR Report, 1978 - 1981
Haywood E. Webb, Jr., Dante C. Youla, and O. M. Gupta Feb. 1982 110 p refs
(AF Proj. 5581)
(AD-A114996; RADC-TR-81-397) Avail: NTIS HC A06/MF A01 CSCL 20/6

This report consists of three parts: 1. A circuit theory model of the spectral estimation problem is given. The flat echo estimator is defined. Some of its properties are explored. 2. Part two addresses a software implementation in an interactive mode. Examples are given. 3. Part three generalizes the scaler problem of Part 1 to the multi-dimensional vector cases. Author (GRA)

N82-31114# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AUTOMATIC TARGET CUEING IN IR IMAGERY M.S. Thesis
Naser A. Hamadani Dec. 1981 87 p refs
(AD-A115480; AFIT/GEO/EE/81D-3) Avail: NTIS HC A05/MF A01 CSCL 17/5

This thesis presents an algorithm for detecting man-made objects embedded in low resolution imagery. A modified Kirsch edge operator is used for initial image enhancing. A normal Kirsch operator is then used for edge detection. A two-dimensional threshold for edges and the original intensity detects the pixels on the edges of the objects only. These pixels are then subjected to connectedness and size tests to detect the blobs which most probable represent man-made objects. The algorithm was tried on 325 pictures and a detection probability of 83.3% was achieved. False alarm probability was less than 10%. Author (GRA)

N82-31115# New Hampshire Univ., Durham. Dept. of Electrical Engineering.
A SYSTEMATIC PROCEDURE FOR CALCULATING THE AVERAGE ILLUMINANCE ON A WORK SKYLIGHTS LOCATED IN A PITCHED ROOF Final Report, Jan. - Nov. 1981
J. B. Murdoch May 1982 53 p refs
(Contract N62583-81-R-307)
(AD-A115523; CEL-CR-82.022) Avail: NTIS HC A04/MF A01 CSCL 13/1

A systematic design procedure has been developed to calculate the average horizontal illuminance upon a work plane due to skylights in a pitched roof. The calculation procedure allows for pitched roofs with slopes up to 30 degrees from horizontal, and for both clear and overcast sky conditions. The procedure is divided into two basic steps: (1) the calculation of total external daylight illuminance upon the sloped skylight surface, and (2) the calculation of average horizontal illuminances upon an interior workplane due to the sloped skylights. Worksheets are used to systemically step through the procedures. All necessary tables and equations are included. Author (GRA)

N82-31116# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Nuclear Effects.

CATHODOLUMINESCENCE AND PHOTOLUMINESCENCE STUDY OF SILICON IMPLANTED GALLIUM ARSENIDE M.S. Thesis

Daniel L. DeForest Mar. 1982 76 p refs

(AD-A115481; AFIT/GNE/PH/82M-6) Avail: NTIS HC A05/MF A01 CSCL 07/2

Depth resolved photoluminescence and cathodoluminescence data were obtained from gallium arsenide implanted with 120 keV silicon ions. The luminescence data were studied as a function of depth in an effort to determine the implant damage profile of the silicon in GaAs. A chemical etchant was used to etch off successive layers of the crystal surface. The substrate material used for this study was bulk GaAs, grown by the Liquid-Encapsulated Czochralski (LEC) method. Author (GRA)

N82-31117# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

PROGRAMMED CONTROL OF A SINE-WAVE GRATING GENERATOR FOR VISUAL RESEARCH M.S. Thesis

Albert L. Lawson Dec. 1981 94 p refs

(AF Proj. 7071)

(AD-A115502; AFIT/GE/EE/81D-33) Avail: NTIS HC A05/MF A01 CSCL 20/6

This describes the development of an automatic controller for an Optronix Optical Signal Generator. The signal generator is used by the Aerospace Medical Laboratory/HEA at Wright-Patterson AFB to test human visual response to sine-wave gratings. The computer used in development of the controller was a Z80 based Mostek MDX CPU-2. Sensing of the optical signal to be controlled was accomplished by a Reticon RC-100 Series Circuit Board with a G Series Array Board containing 1024 diode elements. The Reticon Array Board produces an analog video signal for each diode in the array. The computer then selects every fifteenth diode value and stores it, calculates the actual screen brightness and contrast from the stored values, and outputs a correction signal to the generator. The circuits developed include the flags required to synchronize the computer with the Reticon Card, the circuits required to input the desired values for contrast and brightness, and the circuit used to select every fifteenth diode of the array scan to be read. This controller was never fully operational, but all of the major circuits have been tested and do function. Author (GRA)

N82-31118# Oak Ridge National Lab., Tenn. Fuel Recycle Div.

DEVELOPMENT OF A STANDARD METHODOLOGY FOR OPTIMIZING REMOTE VISUAL DISPLAY FOR NUCLEAR MAINTENANCE TASKS

Margaret M. Clarke, J. Garin (Westinghouse Advanced Reactors Div., Madison, Pa.), and Andrea PrestonAnderson 1981 6 p refs Presented at the Human Factors Soc. Meeting, Rochester, N.Y., 12-16 Oct. 1981 Prepared in cooperation with Oak Ridge Associated Universities, Tenn.

(Contract W-7405-eng-26; DE-AC05-960R-00033)

(DE82-001462; CONF-811032-2) Avail: NTIS HC A02/MF A01

A fuel recycle facility being designed at Oak Ridge National Laboratory involves the Remotex concept: advanced servo-controlled master/slave manipulators, with remote television viewing, will totally replace direct human contact with the radioactive environment. The design of optimal viewing conditions is a critical component of the overall man/machine system. A methodology was developed for optimizing remote visual displays for nuclear maintenance tasks. The usefulness of this approach was demonstrated by preliminary specification of optimal closed circuit TV systems for such tasks. DOE

N82-31119# Forschungsinstitut der Deutschen Bundespost, Darmstadt (West Germany).

INVESTIGATION OF COMPONENTS FOR OPTICAL COMMUNICATION: RESEARCH PROJECT 31 Final Report [UNTERSUCHUNG VON KOMPONENTEN DER OPTISCHEN NACHRICHTENTECHNIK]

R. Gruss 1982 81 p refs In GERMAN

(Heft-7) Avail: NTIS HC A05/MF A01

The suitability of glass fibers for optical communication was experimentally and theoretically investigated with a view to standardization within the postal administrations in Western Europe. The following subjects were experimentally investigated: fabrication of glass fibers, measurement of damping in glasses, glass fibers and glass fiber waveguides, dispersion in glass fibers and glass fiber waveguides, and transmitter and receiver diodes. Subjects theoretically investigated were: multimode fibers, monomode fibers, and possible applications of glass fibers. Author (ESA)

N82-31120# Philips Zentrallaboratorium G.m.b.H., Hamburg (West Germany). Forschungslab.

OPTO-ELECTRONIC SCANNING OF COLOR PICTURES WITH PROFILED PERISTALTIC CCD ALL SOLID STATE LINE SENSORS Final Report, May 1980

Hans Damann, Gert Rabe, Manfred Zinke, Manfred Herrmann, Rainer Imjela, Ingo Laasch, Juergen Mueller, Karl Neumann, Guenter Tauchen, and Joerg Woelber Bonn Bundesministerium fuer Forschung und Technologie Apr. 1982 145 p refs In GERMAN; ENGLISH summary

(BMFT-FB-T-82-051; ISSN-0340-7608) Avail: NTIS HC A01/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 30

A single-chip all solid state line sensor (PP-CCD Tricoli) was fabricated as a basis for the opto-electronic scanning of color pictures. The three photosensitive lines for the color components red, green and blue each contain 625 photo elements. They are arranged in parallel on one silicon crystal, with distance of some 100 micrometers. The line sensor is supplied with extra driving circuitry and signal processing. For color splitting, a color separating digital phase grating was developed which generates the three color components in three central diffraction orders. With the components (Tricoli line sensor, electronic circuity, color separation grating), a model of a slide scanner was built which succesfully demonstrates the feasibility of the proposed color scanning system. Author (ESA)

N82-31121# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).

COMPUTATION OF LIGHT SCATTERING PHENOMENA IN LASER DOPPLER VELOCIMETER (LDV)

M. Timmerman (Royal Military Acad., Brussels) May 1981 106 p refs

(VKI-TN-139) Avail: NTIS HC A06/MF A01

Computer programs which evaluate the performance parameters of a fringe mode laser velocimeter are presented. Mie scattering theory is used to determine the scattering diagrams of spherical particles due to an infalling plane wave. Signal visibility and amplitude curves for different system parameters are calculated. In order to reduce computing cost, the programs were adapted to run on small machines. A PASCAL compiler is used on a microcomputer. As these are only 8 bit machines, computations are slow and available memory space is small, the programs are optimized. Author (ESA)

N82-31122# University Coll., Dublin (Ireland). Dept. of Physics.

FOLLOW-ON CALIBRATION STUDY FOR THE COMS-OCM Final Report

E. OMongain and M. Goodman Paris ESA Feb. 1982 92 p refs

(ESA-CR(P)-1572) Avail: NTIS HC A05/MF A01

Diffuser materials used for calibrating Earth observation equipment (by measuring sunlight scattered by the diffuser) were surveyed. Diffusers are classed into broad types based on whether they are bulk or surface diffusers, and intended for use

in reflection or transmission. Polarization and the relation between surface properties and specularity are discussed. Optical measurements show the need for a diffuser whose diffusing property depends on bulk rather than surface effects. Measurements of radiance factor and radiance coefficient support the proposal that diffuser performance variations be measured by a simple monitor of the diffuser radiance coefficient. Absolute calibration can be transported through the launch phase by transporting the absolute diffuser radiance coefficient at the angles of use, or by transporting diffuser monitor specifications, or by transporting both. Author (ESA)

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-31123# Indiana Univ., Bloomington. Dept. of Chemistry.
REDUCTION OF SPECTRAL INTERFERENCES IN INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPECTROMETRY BY SELECTIVE SPECTRAL LINE MODULATION Interim Technical Report
S. W. Downey and G. M. Hieftje 13 May 1982 36 p refs Revised Submitted for publication
(Contract N00014-76-C-0838; NR Proj. 051-622)
(AD-A114526; INDU/DC/GMH/TR-82/45; ITR-53) Avail: NTIS HC A03/MF A01 CSCL 07/4

Spectral interferences in inductively coupled plasma (ICP) emission spectrometry can be significantly reduced through the use of selective spectral-line modulation (SLM). In this method, a mirrored, rotating chopper directs the emission from an ICP alternately through and around a flame; selective modulation is achieved when the flame contains absorbing atoms identical to emitting atoms in the ICP. The ability of SLM to minimize broad-band, narrow line and scattered light spectral interferences is demonstrated. Signal-to-background ratios for SLM detection are shown to higher than those obtained by conventional detection. The effect of modulating conditions on working curve slope and linearity is discussed and the limitations of the SLM method are critically evaluated. GRA

N82-31124# Wisconsin Univ., Madison. Mathematics Research Center.
STABILITY THEORY OF A CONFINED TOROIDAL PLASMA. PART 1: EXISTENCE AND UNIQUENESS
Peter Laurence (New York Univ., N.Y.) and M. C. Shen Mar. 1982 65 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-80-01960)
(AD-A114599; MRC-TSR-2348) Avail: NTIS HC A04/MF A01 CSCL 20/9

The linear MHD stability of a confined plasma is generally studied by means of energy principles. Up to date, these energy principles have never been justified rigorously, and the existence of a solution to the linearized equations is also tacitly assumed. In this report, based upon a variational approach, we shall first establish the existence and uniqueness of a generalized solution to the linearized Lundquist equations for a toroidal plasma confined in a conducting shell. In a subsequent report, the so-called modified energy principle, which includes linear energy principle as a special case, will be justified rigorously and a solid foundation will then be application of these energy principles to the linear MHD stability of a confined plasma. GRA

N82-31125# Wisconsin Univ., Madison. Mathematics Research Center.
STABILITY THEORY OF A CONFINED TOROIDAL PLASMA. PART 2: MODIFIED ENERGY PRINCIPLE AND GROWTH RATE
Peter Laurence (New York Univ., N.Y.) and M. C. Shen Mar. 1982 29 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-80-1960)
(AD-A114578; MRC-TSR-2349) Avail: NTIS HC A03/MF A01 CSCL 20/9

Based upon the existence and uniqueness of a solution to the linearized Lundquist equations established previously, the modified energy principle for the sigma-stability of a confined toroidal plasma is rigorously justified. A variational principle is developed to find the infimum of sigma, and an estimate for the maximum growth rate is obtained. The results are also extended to a diffuse pinch and a multiple tori plasma. Author (GRA)

N82-31126*# Naval Research Lab., Washington, D. C. Plasma Physics Branch.
INFLUENCE OF MAGNETIC SHEAR ON THE LOWER HYBRID DRIFT INSTABILITY IN FINITE BETA PLASMAS Interim Report
J. D. Huba and G. Ganguli 18 May 1982 40 p refs Sponsored in part by NASA, Washington
(RR0330244)
(NASA-CR-169108; NAS 1.26:169108; AD-A114814; NRL-MR-4827) Avail: NTIS HC A03/MF A01 CSCL 20/3

A self-consistent theory of the lower-hybrid-drift instability in finite beta plasmas containing magnetic shear is presented. The important finite beta effects included are (1) the coupling of electrostatic and electromagnetic oscillations and (2) the orbit modification of the electrons due to delta B. It is found that the effect of electromagnetic coupling is a destabilizing influence on the instability in a sheared field. On the other hand, the effect of electron orbit modification (i.e., electron delta B drift-wave resonance) is a stabilizing influence. The key parameter which dictates which effect is more important is Te/Ti. In the limit Te < Ti, the electromagnetic effect dominates, while for Te greater than or equal Ti, the delta B electron drift-wave resonance is more important. The relevance of these results to reversed field is discussed. Author (GRA)

N82-31127# Naval Research Lab., Washington, D. C.
XUV AND X-RAY SPECTRA FROM TEXAS TOKAMAK PLASMAS Memorandum Report, 1981 - 1982
R. D. Bleach, P. G. Burkhalter, D. J. Nagel, and W. Rowan 28 May 1982 23 p refs
(Contract DE-AI01-76ET-53028)
(AD-A115329; NRL-MR-4822) Avail: NTIS HC A02/MF A01 CSCL 20/9

The first XUV and X-ray spectra were recorded from TEXT with a grazing-incidence grating spectrograph and new crystal spectrographs. Time and space-integrated data yielded a qualitative description of the plasma. Line radiation from O, Cr, Fe, and Ni ions were recorded and identified with the aid of ab initio atomic structure calculations. GRA

N82-31128# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SOFT PHOTON EFFECTS ON VACUUM POWER FLOW M.S. Thesis
Oakley J. Mitchell and Richard J. Blaher Dec. 1981 62 p refs
(AD-A115516; AFIT/GE/EE/81D-12) Avail: NTIS HC A04/MF A01 CSCL 20/9

Understanding the physical processes of high power electrical energy is of major importance for the advancement of state-of-art directed energy, simulation and confined fusion programs. Generation of high voltage, short duration pulses may result in high energy density plasma which produces quantities of VUV and soft X-ray photons in the range of 0.15-10 ev. Power transport down vacuum lines presents two problems which must be dealt with in every application-insulator flashover and electrode gap closure. The pulsed flashover and ablative closure mechanisms under soft VUV photon fluence are described. Two tests were conducted. First, an insulator surface was subjected to VUV photons (0.5 ev) using apertures of 0.0156 to 0.5 inches in diameter with and without a quartz window. The apertures had no effect in inhibiting a flashover; however, the quartz window prevented the occurrance of insulator flashover. Second the gap closure rate of copper electrodes under the photon fluence of 6 x 10'9 watts per square meter was measured. A gap closure rate of 0.35 cm/microsecond was determined for the copper electrodes. GRA

N82-31129# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
CATHODE SHEATH EFFECTS IN EXTERNALLY IONIZED

GAS DISCHARGES M.S. Thesis
Marc R. Hallada Dec. 1981 167 p refs
(AD-A115513; AFIT/GEP/PH/81D-4) Avail: NTIS HC A08/MF A01 CSCL 20/9

Lowke's theoretical investigation of gas discharges sustained by an external ionization source was extended. In addition to the processes of electron diffusion, electron-ion combination, and ionization of the ground state considered by Lowke, electron-impact ionization of metastable states and secondary emission from the cathode were included in the present analysis. Current-voltage (I-V) characteristics were obtained for discharges in argon and methane. At current densities of 1A/sq cm, Townsend ionization in the cathode sheath resulted in positive-ion number densities which significantly exceeded those in the positive column. I-V characteristics obtained revealed a sharp rise in the current at an 'ignition' voltage. The slope of the high-current region of the characteristic increased for an increase in secondary emission. With the addition of metastable ionization, the ignition voltage and the entire I-V voltage and at low external ionization source strengths, an unstable region of negative differential conductivity was observed. Author (GRA)

N82-31130# Texas Univ., Austin. Fusion Research Center.
ION THERMAL CONDUCTIVITY FOR A PURE TOKAMAK PLASMA
C. Bolton and A. Ware Oct. 1981 48 p refs
(Contract DE-AC05-76ET-53036)
(DE82-007781; DOE/ET-53036/32; FRCR-239) Avail: NTIS HC A03/MF A01

The neoclassical and Pfirsch-Schlueter component of the ion heat conduction for a pure hydrogen Tokamak plasma recalculated without assuming large aspect ratio and without neglecting energy scattering collisions. Using a model collision operator the conductivity is determined numerically for various collision frequencies and aspect ratios. An approximate algebraic expression is fitted to the results. Even for comparatively large aspect ratios (approx. 10) energy scattering increases the conductivity in the banana regime by about 50% and for small aspect ratios (approx. 3.3) the Pfirsch-Schlueter contribution causes a further increase of approximately 60%. DOE

N82-31131# Texas Univ., Austin. Inst. for Fusion Studies.
CURVATURE-DRIVEN INSTABILITES IN A HOT-ELECTRON PLASMA: RADIAL ANALYSIS
H. L. Berk, J. W. VanDam, M. N. Rosenbluth, and D. A. Spong (ORNL) Dec. 1981 76 p refs
(Contracts DE-FG05-80ET-53088; W-7405-eng-26)
(DE82-006888; DOE/ET-53088/50) Avail: NTIS HC A05/MF A01

The theory of unfavorable curvature driven instabilities was developed for a plasma interacting with a hot electron ring whose drift frequencies are larger than the growth rates predicted from conventional magnetohydrodynamic theory. A z-pinch model emphasizes the radial structure of the problem. Stability criteria are obtained for the five possible modes of instability: the conventional hot electron interchange, a high frequency hot electron interchange (at frequencies larger than the ion cyclotron frequency), a compressional instability, a background pressure driven interchange, and an interacting pressure driven interchange. DOE

N82-31132# Texas Univ., Austin.
INVESTIGATION OF THE MICROWAVE EMISSION FROM THE PRETEXT TOKAMAK Ph.D. Thesis
R. F. Gandy Oct. 1981 149 p refs
(Contract DE-AS05-77ET-53042)
(DE82-007783; DOE/ET-53042/11) Avail: NTIS HC A07/MF A01

The microwave emission from the PRETEXT Tokamak was studied. Two types of emission were observed: electron cyclotron and electron plasma frequency. Three general emission regimes were identified. DOE

N82-31133# Texas Univ., Austin. Fusion Research Center.
SIMPLIFIED OHMIC-HEATING CIRCUIT FOR TOKAMAKS
S. A. Eckstrand, R. D. Bengtson, and J. F. Benesch Sep. 1981 16 p refs
(Contract DE-AS05-77ET-53042)
(DE82-007782; DOE/ET-53042/5) Avail: NTIS HC A02/MF A01

A description is presented of the ohmic heating circuit on PRETEXT, which operates without an explicit breaking switch. The engineering consequences of this approach are discussed. Observations of the runaway electron component of the plasma current in the device are discussed to demonstrate the advantages of this circuit. Possible extensions of this work applicable to larger machines are mentioned. DOE

N82-31134# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
COMPARISON OF COMPUTED REACTION RATES USING DIFFERENT METHODS AND DATA FOR STARFIRE AND TMHR BENCHMARK BLANKETS
A. J. Scott and M. L. Takata Dec. 1981 42 p refs
(Contract DE-AC07-76ID-01570)
(DE82-010045; EGG-PHYS-5654) Avail: NTIS HC A03/MF A01

Some RAFFLE Monte Carlo calculations using ENDF/B V5 data were performed for the TMHR suppressed fission benchmark blanket and the STARFIRE reference design blanket. One dimensional cylindrical geometry was employed. ANISN S/sub N/ calculations were also done for both blankets using the DL37F, FLUNG, and MACKLIB IV data sets. Reaction rates from RAFFLE and ANISN are compared with each other and with results obtained by the blanket designers. For both blankets, the tritium breeding ratio (TBR) predicted by RAFFLE and ANISN agree within 3%. For TMHR, TBR results lie in between those obtained by TRW and GA, which disagree by 10 to 15%. For STARFIRE, TBR results are 7 to 10% lower than ANL's values. The reason for the large discrepancies is unknown; however, it is concluded that modeling errors are unlikely so that data sources and processing differences used to generate cross section libraries are implied. DOE

N82-31135# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
NUMERICAL SIMULATION OF ELECTROSTATIC WAVES IN PLASMAS [NUMERISCHE SIMULATION ELEKTROSTATISCHER WELLEN IM PLASMEN]
U. Erz Aug. 1981 89 p refs In GERMAN
(IPF-81-10) Avail: NTIS HC A05/MF A01

The propagation of electrostatic waves in plasmas and the nonlinear interactions at large wave amplitudes were investigated, using a numerical method to simulate the plasma. The Vlasov equation was separated in a free streaming and an accelerated part in order to solve the Vlasov-Poisson equation set numerically. The resulting differential equations were solved, using the method of weighted residues and the finite element method. Simulation of the linear plasma wave behavior (Landau damping) shows ideal agreement with analytical results. Simulation of electrostatic waves of larger amplitudes shows more important deviations from theoretical models. For weakly damped waves, the initially accelerated particles are again trapped by the wave. For strongly damped waves, a large number of the initially accelerated particles build up a locally modulated particle beam and hence cause a growth of the lower sideband waves. Author (ESA)

N82-31136# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
SPECTROSCOPIC INVESTIGATIONS OF IMPURITIES IN THE BELT PINCH HECTOR [SPEKTROSKOPISCHE UNTERSUCHUNGEN VON VERUNREINIGUNGEN AM BELT-PINCH HECTOR]
Joachim Singethan Apr. 1981 52 p refs In GERMAN
(IPF-81-12) Avail: NTIS HC A04

Line spectra of impurities in the HECTOR belt pinch were spectroscopically investigated in the UV domain in order to determine impurity concentrations and ensuing radiation losses as well as the temporal electron temperature evolution. The spectra were measured, using a monochromator, photomultiplier, oscilloscope, and polaroid film, in the wavelength range from 200 to 660 nm. The sum of impurity concentrations (C and O) is as low as 0.7 %. The temporal electron temperature evolution is obtained by solving the rate equations for oxygen and adapting to the temporal emission line behavior, and agrees very well with the Thomson scattering results. At filling pressures of 0.2 and

0.1 Pa; the electron temperature is typically 3 to 5 times higher than in a high density discharge (0.27 Pa) with classical pinch behavior, due to turbulent heating. A high energy electron component is not detected. Author (ESA)

N82-31137# Fom-Instituut voor Plasmafysica, Jutphaas (Netherlands).
[REPORT OF THE PLASMA PHYSICS LABORATORY] Annual Status Report, 1981
Mar. 1982 93 p refs Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (ZWO)
Avail: NTIS HC A05/MF A01

Theoretical and experimental work in plasma physics is summarized. Technological and engineering aspects of plasma experiments in the SPICA, TORTUR 2, and RINGBOOG 2 reactors are discussed with emphasis on screw pinch, turbulent heating, and gas blankets. The free boundary equilibrium in high beta Tokamak plasma, wave dynamics, and transport problems were investigated. Author (ESA)

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

N82-31138# Kennedy (David P.) and Associates, Inc., Gainesville, Fla.
INVESTIGATION OF THE CURRENT VOLTAGE RELATIONSHIP FOR LOW BARRIER SCHOTTKY DIODES Final Technical Report
David P. Kennedy Griffiss AFB, N.Y. RADC Feb. 1982 238 p refs
(Contract F19628-80-C-0020; AF Proj. 2305)
(AD-A113211; RADC-TR-82-13) Avail: NTIS HC A11/MF A01 CSCL 20/12

A model is developed for the current voltage characteristics of metal, p-type semiconductor Schottky barriers. The model accounts for transition of electrons from the semiconductor valence band to empty states below the metal Fermi energy. These transitions lead to an effective barrier energy that is lower than predicted by classical models. The model also includes two junction current mechanisms that give rise to higher reverse currents than that predicted classically. Author (GRA)

N82-31139# Rockwell International Corp., Thousand Oaks, Calif. Microelectronics Research and Development Center.
LSI/VLSI ION IMPLANTED GaAs IC PROCESSING Quarterly Technical Report, 1 May - 31 Jul. 1981
R. Zucca, P. Asbeck, B. M. Welch, C. G. Kirkpatrick, C. P. Lee, Y. D. Shen, and A. Firstenberg 10 Feb. 1982 41 p refs
(Contract F49620-80-C-0101; ARPA Order 3384)
(AD-A114798; MRDC41070.12QR; AFOSR-82-0203TR; QTR-4) Avail: NTIS HC A03/MF A01 CSCL 09/5

This report covers the fourth quarter of a program on LSI/VLSI ion implanted planar GaAs integrated circuit processing. The goal of this program is to realize the full potential of GaAs digital integrated circuits employing depletion mode MESFETs by developing the necessary processing methods and material capabilities to extend device complexity to VLSI. In the fourth quarter fabrication of the first wafers with mask set AR6, the last mask set to be employed with one inch wafers, was completed. Work on circuit reliability has continued, while process steps that may be limiting circuit yield are being investigated. GRA

N82-31140# Spire Corp., Bedford, Mass.
HgCdTe FABRICATION USING DIRECTED ENERGY TECHNIQUES Semiannual Technical Report, 1 Oct. 1981 - 31 Mar. 1982
Anton C. Greenwald and Robert G. Wolfson Apr. 1982 45 p refs Prepared in cooperation with New England Research Center, Sudbury, Mass.
(Contract MDA903-81-C-0410; ARPA Order 3800)
(AD-A114605; SAR-82-10082-01) Avail: NTIS HC A03/MF A01 CSCL 20/7

The goal of this research is to produce large-area, thin-film, single crystal HgCdTe material for infrared detectors. This report describes initial results for the evaporation of CdTe onto insulating crystalline substrates (hot wall epitaxy), improvement of the surface morphology by pulsed electron-beam processing, and conversion to HgCdTe by evaporation and diffusion at constant temperature. Improvement in quality over past results and an increase in sample size to 2-inch diameter is expected with upgraded equipment described in this report. GRA

N82-31141# Air Force Weapons Lab., Kirtland AFB, N. Mex.
X-RAY INDUCED ELECTRON EMISSION Final Report
Charles A. Aeby Apr. 1982 206 p refs
(AF Proj. 4695)
(AD-A115439; AFWL-TR-81-222) Avail: NTIS HC A10/MF A01 CSCL 07/4

The development and use of a magnetic spectrograph for the measurement of X-ray induced electron emission is described. Results are presented for metal and dielectric targets ranging in atomic number from Z=6 to Z-82. Materials studied were lead, tantalum, copper, aluminum, magnesium, solar cell cover glass, silica cloth, thermal control paint, Kevlar, Mylar, and conducting/nonconducting epoxy. Direct measurement was made of the quantum yield and energy distribution of electrons emitted at angles of 0 deg, 30 deg, 45 deg and 60 deg with respect to the surface normal of targets exposed to normal incidence filtered and unfiltered 50 kV bremsstrah lung X-rays. Experimental results are compared with previous measurements where possible, and with computer code predictions where predictive capability matches the measurement range. The experimental results corroborates the cos theta angular dependence predicted by simple theoretical models, particularly for medium and high Z materials. A trend toward isotropic emission distribution is noted for the lower Z materials. Compared to the measured results, the emission yields predicted by a commonly used analytical model are low by approximately a factor of 2 for the unfiltered X-ray spectrum. GRA

N82-31142# Texas Univ., Austin. Dept. of Chemistry.
PYRROLYL COMPOUNDS OF THE MAIN-GROUP ELEMENTS. 2. THE CRYSTAL AND MOLECULAR STRUCTURE OF (n(''1)-C4H4N)4Si AND THE REACTION OF C4H4NLi WITH SiHCLSUB3
Jerry L. Atwood, Alan H. Cowley, William E. Hunter, and Salvador F. Sena 25 May 1982 36 p refs Submitted for publication
(Contract N00014-82-K-0290; NR Proj. 053-801)
(AD-A115177; TR-82-02) Avail: NTIS HC A03/MF A01 CSCL 20/2

In a previous paper, we discussed the syntheses, structures and reactivities of tris(pyrrolyl)phosphine and arsine. The present paper is concerned with pyrrolyl compounds of silicon. Interestingly, (C4H4N)4Si (1)3 and (C4H4N)3 SiH (2)4 were prepared over seventy years ago by the reaction of C4H4NK with SiCl4 and SiHCl3, respectively. However, compound 1 has been mentioned only once in the intervening years. We have investigated the reaction of C4H4NLi with SiCl4 and SiHCl3 and found that compound 1 is converted to compound 2 in the presence of C4H4NLi. A single-crystal X-ray diffracion study of 1 was undertaken to define the mode of bonding between silicon and the pyrrolyl ligands. Moreover, since the pyrrolyl ligand is potentially a two-fold rotor, considerable interest focussed on the stereochemistry of 1. Author (GRA)

N82-31143# Rochester Univ., N. Y. Dept. of Chemistry.
LASER-INDUCED GAS-PHASE AND SURFACE RATE PROCESSES: ELECTRONIC EXCITATIONS AND BOUND-CONTINUUM INTERACTIONS
Thomas F. George, Kai-Shue Lam, Michael Hutchinson, and William C. Murphy May 1982 30 p refs Submitted for publication
(Contract N00014-80-C-0472; Grants NSF CHE-80-22874; AF-AFOSR-0046-82; NR Proj. 056-749)
(AD-A115194; TR-19) Avail: NTIS HC A03/MF A01 CSCL 20/5

Two different types of laser-induced gas-phase rate processes are studied theoretically: collisional ionization and multiphoton resonances in atom-atom scattering. The first involves the coupling between bound and continuum electronic states, and the second between bound and continuum vibrational states. In

connection with surface processes, the use of a laser to excite electrons from the valence band to surface states of a semiconductor and the resulting effect on an adspecies is explored.
Author (GRA)

N82-31144# Texas Instruments, Inc., Dallas. Central Research Labs.
LATERAL SEEDING OF SILICON-ON-INSULATOR Final Report, 1 Jul. - 31 Dec. 1981
H. W. Lam and R. F. Pinizzotto Apr. 1982 36 p refs
(Contract N00014-81-C-0461)
(AD-A115273; TI-08-82-17) Avail: NTIS HC A03/MF A01 CSCL 20/2

A micro-zone melting growth process using a scanning line-shaped graphite heater has been developed to produce (100) silicon-on-insulator (SOI) material over a three inch wafer. Very low angle grain boundaries (less than 0.3 deg) still exist extensively in the material. A 2 micrometer thick layer of plasma CVD oxide deposited from N20 and SiH4 has been found to be an effective capping structure in preventing the molten silicon from beading up. A SiC coating on the top heating element is used to prevent carbon contamination of the recrystallized film. CMOS devices have been fabricated in the recrystallized SOI material. Surface electron and surface hole mobility values of typically 600 sq cm./V-s and 300 sq cm/V-s, respectively, have been measured. The leakage current is uniformly low, typically in the 10 tro the -13th power A/micrometer channel width range at VDS = 1 V. It has also been determined that the low angle grain boundaries do not have a primary effect on the carrier mobility. Furthermore, the problem of enhanced diffusion of arsenic along the grain boundaries is significant less severe in the present SOI material. The small protrusions found in the surface of the recrystallized film did not contribute to gate shorts in the devices measured. However, they may present a reliability problem. Attempts are underway to improve the process to eliminate the protrusions.
Author (GRA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-31145# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Nuclear Engineering.
CONVERGENCE AND ERROR CRITERIA OF ITERATIVE NUMERICAL SOLUTIONS TO THE TRANSIENT HEAT CONDUCTION EQUATION M.S. Thesis
Robert Alan Warren Mar. 1982 169 p refs
(AD-A115495; AFIT/GNE/PH/82M-12) Avail: NTIS HC A08/MF A01 CSCL 20/13

Full implicit finite differencing was used to approximate transient heat conduction in two spacial dimensions. The resulting set of linear simultaneous equations was solved using successive over-relaxation iterative methods. Errors between the exact matric solution and the iterated solution were computed and compared with several methods of determining error approximations that use the displacement between iterations and an associated parameter. Fundamental parameters of the iteration matrix, such as the spectral radius, were tested as parameters in the error approximation methods. The error methods were compared with respect to accuracy, ease of computing, and computer resources required. The nodal density used in the numerical approximation to the physical problem was compared with the spectral radius of the resulting iterative matrix problem. The spectral radius increases as nodal density increases. GRA

N82-31146# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Nuclear Effects.
A COMPARISON OF FINITE-DIFFERENCE METHODS FOR THE SOLUTION OF THE TRANSIENT HEAT CONDUCTION EQUATION IN INHOMOGENEOUS MEDIA M.S. Thesis
Kenneth William Blevins Mar. 1982 110 p refs
(AD-A115500; AFIT/GNE/PH/82-4) Avail: NTIS HC A06/MF A01 CSCL 12/1

The transient heat conduction equation is solved for inhomogeneous media using the Explicit, Pure-Implicit, Crank-Nicolson and Douglas finite-difference methods, and the numerical solutions are investigated with respect to accuracy and stability. The inherent discontinuity between the initial and boundary conditions is accounted for by mesh refinement. For the two versions of the problem for which the four numerical methods are investigated, all four methods are found to be of equivalent accuracy for small values of the Fourier Modulus. While the Pure-Implicit, Crank-Nicolson and Douglas methods are unconditionally stable, the Crank-Nicolson and Douglas methods are very inaccurate at large values of the Fourier Modulus due to oscillatory behavior.
Author (GRA)

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-31147*# National Aeronautics and Space Administration, Washington, D. C.
PRESENT CHALLENGES OF RESEARCH AND TECHNOLOGY POLITICS
Andreas V. Bulow May 1982 12 p Transl. into ENGLISH from DFVLR-Nachr. (West Germany), no. 35, Mar. 1982 p 3-5 Transl. by Scientific Translation Service, Santa Barbara, Calif. (Contract NASw-3542)
(NASA-TM-76720; NAS 1.15:76720) Avail: NTIS HC A02/MF A01 CSCL 05A

Research and technology in Germany are discussed. The rapid transfer of scientific knowledge and techniques from the laboratory to the manufacturing and industrial communities is indentified as a priority. It is recommended that the government give maximum support to the aviation and space flight industries.
R.J.F.

N82-31148# Wisconsin Univ., Milwaukee.
TOWARD AN UNDERSTANDING OF INNOVATION ADOPTION: AN EMPIRICAL APPLICATION OF THE THEORETICAL CONTRIBUTIONS OF DOWNS AND MOHR
Richard D. Bingham, Patrica K. Freeman, and Claire L. Felbinger 1981 115 p refs
(Grant NSF PRA-79-20149)
(PB82-164781; NSF/ISI-81003) Avail: NTIS HC A06/MF A01 CSCL 05A

The instability of findings in innovative research with regard to complex organizations is investigated. Factors identified as the possible causes of this instability and their methodological prescriptions toward the development of an integrative theory are examined. The factors are: (1) variation among primary attributes; (2) interaction; (3) ecological inferences; and (4) varying operationalizations of innovation. GRA

N82-30866*# Technische Hogeschool, Delft (Netherlands).
SUPERVISION OF DYNAMIC SYSTEMS: MONITORING, DECISION-MAKING AND CONTROL
Ted N. White *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 540-547 refs Sponsored by the Netherlands Organization for the Advancement of Pure Research (ZWO) (For primary document see N82-30833 21-51)
Avail: NTIS HC A99/MF A01 CSCL 05A

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software*.

N82-31149*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

GEOGRAPHIC INFORMATION SYSTEMS AT THE GODDARD SPACE FLIGHT CENTER

Michael Goldberg May 1982 25 p refs

(NASA-TM-83941; NAS 1.15:83941) Avail: NTIS HC A02/MF A01 CSCL 05B

The basic functions of a Geographic Information System (GIS) and the different ways that a GIS may be implemented are described. It surveys that GIS software packages that are currently in operation at the Goddard Space Flight Center and discusses the types of applications for which they are best suited. Future plans for in-house GIS research and development are outlined.

Author

N82-31150# National Commission on Libraries and Information Science, Washington, D. C. Intergovernmental Library Cooperation Project.

TOWARD A FEDERAL LIBRARY AND INFORMATION SERVICES NETWORK: A PROPOSAL

Alphonse F. Trezza Library of Congress 1982 138 p refs Sponsored in part by Library of Congress

Avail: NTIS HC A07/MF A01

Methods to improve the coordination of resources and services among federal libraries and to increase cooperation between federal and nonfederal libraries, in order to meet national, state and local needs were determined. Federal libraries in three federal regions - Region 5 (Midwest), Region 6 (Southwest) and Region 9 (Arizona, California, Nevada and the Pacific) - were studied through meetings and questionnaires. Visits were also made to the directors of library and information services programs of major federal agencies in the Washington area, so as to bring to bear the perspectives of both parent agencies and field libraries in the development of meaningful recommendations for the study. Findings from the field visits and questionnaires indicate that federal libraries tend to look to nonfederal libraries for cooperation and support for library and information services, and in turn are prepared to share their collections and services with their nonfederal library counterparts. S.L.

N82-31151# Oak Ridge National Lab., Tenn. Chemical Technology Div.

INFORMATION GATHERING FOR THE TRANSPORTATION STATISTICS DATA BANK

L. B. Shappert and P. J. Mason Oct. 1981 31 p refs

(Contract W-7405-eng-26)

(DE82-001360; ORNL/TM-7880) Avail: NTIS HC A03/MF A01

The Transportation Statistics Data Bank (TSDB) was developed in 1974 to collect information on the transport of Department of Energy (DOE) materials. This computer program may be used to provide the framework for collecting more detailed information on DOE shipments of radioactive materials. The type of information that is needed in this area is described and it is concluded that the existing system could be readily modified to collect and process it. The additional needed information, available from bills of lading and similar documents, could be gathered from DOE field offices and transferred in a standard format to the TSDB system. Costs of the system are also discussed briefly. DOE

N82-31152# National Bureau of Standards, Washington, D.C.

DIMENSIONS/NBS, VOLUME 65, NUMBER 8, OCTOBER 1981 Final Issue

Oct. 1981 33 p

(PB82-165804; NBS-DIM-65-8) Avail: NTIS HC A03/MF A01 CSCL 05B

Short summaries of major technical developments, highlights of work in progress, major speeches and statements and a listing of NBS publications are included. Author

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-31153*# National Aeronautics and Space Administration, Washington, D. C.

EXTRACTS FROM PROBLEMS OF AIR LAW, A COLLECTION OF WORKS OF THE SECTION OF AIR LAW OF THE AVIAKHIM SOCIETY OF THE USSR AND AVIAKHIM RSFSR

P. I. Baranov, ed., V. A. Zarzar, ed., Ye. A. Korovin, ed., V. L. Lakhtin, ed., and A. V. Sabanina, ed. Jun. 1982 25 p Transl. into ENGLISH from the book "Voprosy Vozdushnogo Prava. Sbornik Trudov Sektsii Vozdushnogo Prava Soyuza Aviakhim SSSRi Aviakhim RSFSE" Moscow, Aviakhim Press, 1927 p 89-110 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76913; NAS 1.15:76913) Avail: NTIS HC A02/MF A01 CSCL 05D

The difficulties of developing a body of international law to govern air travel is discussed. A summary of literature and agreements is presented as well as a brief history. Air space over the poles and the legality of methods of claiming territory in the polar regions is discussed. R.J.F.

N82-31154# Committee on Science and Technology (U. S. House).

SCIENCE, TECHNOLOGY, AND AMERICAN DIPLOMACY, 1982

Washington GPO 1982 380 p refs Presented to the Comm. on Sci. and Technol. and the Comm. on Foreign Affair, 97th Congr., 2nd Sess., Jun. 1982

(GPO-94-472) Avail: Committee on Science and Technology

The U.S. Government's domestic and international activities in the fields of science and technology are discussed. Programs relating to health, agriculture, energy technology, environment protection, oceans, and other areas of mutual interest are discussed. R.J.F.

N82-31155# Committee on Science and Technology (U. S. House).

EARTHQUAKE HAZARDS REDUCTION ACT OF 1977 AUTHORIZATION, PART 2

Washington GPO 1982 20 p refs Rept. to accompany H.R. 6272 presented by the Comm. on Sci. and Technol., 97th Congr., 2nd Sess., 17 May 1982

(GPO-89-006; H-Rept-97-535-Pt-2) Avail: US Capitol, House Document Room

A bill to amend the Earthquake Hazards Reduction Act was discussed. Legislative summaries and testimony are presented. N.W.

N82-31156# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

ACQUISITION OF WIND RIGHTS FOR WIND ENERGY DEVELOPMENT

Robert J. Noun Nov. 1981 12 p refs Presented at the 5th Bien. Wind Energy Workshop, Washington, D.C., 5-7 Oct. 1981

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE82-001545; SERI/TP-211-1421; CONF-811043-5) Avail: NTIS HC A02/MF A01

Identifying suitable sites for large wind machine clusters, or wind farms, requires more than finding a location with an adequate wind resource. Consideration must also be given to the question of how land use policies and regulations will affect the siting of wind system installations. In particular, the issue of acquiring wind rights, or guaranteed access to the wind resource for electric power generation, will be vital to the development of wind energy. This paper examines several methods for acquiring and preserving access to the wind resource and for dealing with related land use issues. DOE

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

N82-31157*# Gibbs and Hill, Inc., New York.
OPERATIONS ANALYSIS OF GRAVITY ASSISTED RAPID TRANSIT Final Report
30 Oct. 1981 51 p refs
(Contract JPL-955934)
(NASA-CR-169240; NAS 1.26:169240) Avail: NTIS HC A04/MF A01 CSCL 13F

Gravity assisted rapid transit (GART) with 6 percent grades before and after each station are compared with conventional systems in terms of energy consumption, run time, line capacity and schedule stability under abnormal circumstances. Parametric analyses of run times and energy consumption include the impact of alternate accelerating and braking levels. The capacity analysis uses a network simulation program to determine the location and severity of all signal delays. Based on results of initial simulations, the block design was revised to eliminate bottlenecks in normal operations. The systems are then compared at headways of 80 to 180 seconds. One month of incidence reports of a modern operating transit system are reviewed to determine the failures to be simulated. The impact of failures resulting in station delays (30 to 360 seconds), speed limit reduction (20 mph and 30 mph to one or more trains), vehicle performance (75 percent acceleration) are compared at scheduled headway of 90 to 180 seconds. Author

N82-31158*# Detroit Diesel Allison, Indianapolis, Ind.
CERAMIC APPLICATIONS IN TURBINE ENGINES Semiannual Report, 1 Jan. - 30 Jun. 1980
S. Michael Hudson, Michael A. Janovicz, and Franklin A. Rockwood Nov. 1980 177 p
(Contracts DEN3-17; EC-77-A-31-1040)
(NASA-CR-165197; NAS 1.26:165197; EDR-10383) Avail: NTIS HC A09/MF A01 CSCL 13F

The design and testing of gas turbine engines employing ceramic components is discussed. Thermal shock and vibration test results as well as spin tests of various engine components are discussed. R.J.F.

N82-31159*# National Aeronautics and Space Administration, Washington, D. C.
ROLE OF THE DEVELOPING NATIONS IN THE DEVELOPMENT AND OPTIMAL USE OF SPACE TECHNOLOGY
M. Sanchez Pena May 1982 11 p Transl. into ENGLISH of "Rol de los Paises en Desarrollo en el Dearollo y Optima Utilizacion de la Technologie Especial" Argentina, 1982 9 p Presented at the United Nations Reg. Seminar on Space Appl., 1982 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by National Commission of Space Research, Argentina
(Contract NASw-3541)
(NASA-TM-76896; NAS 1.15:76896) Avail: NTIS HC A02/MF A01 CSCL 05A

The economic and social factors are discussed which play a role in the advancement of space technology in developing nations. It is concluded that mutual collaboration between developed and developing nations is the basic element which will allow developing nations to take part in space experiments and research. B.W.

N82-31160*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PROGRESS ON ADVANCED dc AND ac INDUCTION DRIVES FOR ELECTRIC VEHICLES
Harvey J. Schwartz 1982 16 p refs Presented at the Drive Elec. Amsterdam '82, Amsterdam, 25-29 Oct. 1982
(Contract DE-AI01-77CS-51044)
(NASA-TM-82895; E1273; NAS 1.15:82895; DOE/NASA/51044-27) Avail: NTIS HC A02/MF A01 CSCL 13F

Progress is reported in the development of complete electric vehicle propulsion systems, and the results of tests on the Road Load Simulator of two such systems representative of advanced dc and ac drive technology are presented. One is the system used in the DOE's ETV-1 integrated test vehicle which consists of a shunt wound dc traction motor under microprocessor control using a transistorized controller. The motor drives the vehicle through a fixed ratio transmission. The second system uses an ac induction motor controlled by transistorized pulse width modulated inverter which drives through a two speed automatically shifted transmission. The inverter and transmission both operate under the control of a microprocessor. The characteristics of these systems are also compared with the propulsion system technology available in vehicles being manufactured at the inception of the DOE program and with an advanced, highly integrated propulsion system upon which technology development was recently initiated. Author

N82-31161# Sandia Labs., Albuquerque, N. Mex.
TRANSPORTATION ACCIDENTS
R. E. Luna and E. L. Wilmot 1981 7 p refs Presented at the Workshop on Parameterization of Mixed Layer Diffusion, Las Cruces, N. Mex., 20 Oct. 1981
(Contract DE-AC04-76DP-000789)
(DE82-002550; SAND-81-1921C; CONF-811091-1) Avail: NTIS HC A02/MF A01

Methods for predicting the possible consequences and locations, of and population and property affected by transportation accidents involving radioactive materials are discussed. Models for assessing the consequences of release of these materials in the transportation setting are considered. Risk analysis and environmental impact statements frequently have used the Pasquill-Gifford/Gaussian techniques for releases of short duration, which are both simple and easy to apply and require a minimum amount of detailed information. Selection of specific parameters to use in specific transportation situations is discussed. Additional complications arise because source terms are not well characterized, release rates can be variable over short and long time periods, and mechanisms by which source aerosols become entrained in air are not always obvious. Some approaches used to address these problems are reviewed with emphasis on guidelines to avoid the worst-case scenario syndrome. DOE

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-31162*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DOCUMENTATION FOR THE MACHINE-READABLE

VERSION OF THE GENERAL CATALOGUE OF TRIGONOMETRIC STELLAR PARALLAXES AND SUPPLEMENT

Wayne H. Warren, Jr. Jun. 1982 13 p refs
(NASA-TM-84775; NAS 1.15:84775; NSSDC/WDC-A-R/S-82-20) Avail: NTIS HC A02/MF A01 CSCL 03A

The machine-readable version of the General Catalog of Trigonometric Stellar parallaxes as distributed by the Astronomical Data Center is described. It is intended to enable users to read and process the data without problems and guesswork. The source reference should be consulted for details concerning the compilation of the main catalogue and supplement, the probable errors, and the weighting system used to combine determinations from different observatories. L.F.M.

N82-31163*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ADVANCES IN ULTRAVIOLET ASTRONOMY: FOUR YEARS OF IUE RESEARCH

Yoji Kondo, ed., Jaylee M. Mead, ed., and Robert D. Chapman, ed. 1982 653 p refs Proc. of Symp. held at Greenbelt, Md., 30 Mar. - 1 Apr. 1982
(NASA-CP-2238; NAS 1.55:2238) Avail: NTIS HC A99/MF A01 CSCL 03A

Results of ultraviolet observations of cool, hot, binary, and variable stars; galaxies; the interstellar medium; and the solar system utilizing the International Ultraviolet Explorer are discussed. For individual titles, see N82-31164 through N82-31276.

N82-31164*# Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass.

MASS LOSS FROM COOL STARS, FACTS, FADS, AND FALLACIES

A. K. Dupree *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 3-16 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The accumulation of observational material (ultraviolet spectroscopic measures, quantitative optical spectroscopy, and X-ray photometry) and its use in discerning the presence and character of mass loss across the cool half of the H-R diagram and establishing constraints on theoretical models are discussed. Analogies with closed and open solar magnetic structures are found. Two determinants of atmospheric wind structure, temperature and gravity, may suffice in a most superficial way to define the wind and atmospheric structure in a star, however it is apparent that there is still a missing parameter which may stem from magnetic activity and its particular configuration. Theories that appear successful in reproducing observed line profiles, wind temperatures, and terminal velocities incorporate Alfven wave heating and momentum deposition. Successive observations of an active binary (lambda and G8III-IV) and a supergiant star, alpha Aqr (G2 Ib) revealed that magnetic activity and perhaps mass loss occur on restricted regions of a stellar surface and that long-term structures are present in the wind. These phenomena are present in the solar atmosphere and wind and may be considered a general characteristic of stellar winds. M.G.

N82-31165*# National Bureau of Standards, Boulder, Colo. Joint Inst. for Lab. Astrophysics.

THE STRUCTURE AND ENERGY BALANCE OF COOL STAR ATMOSPHERES

Jeffrey L. Linsky *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 17-32 refs Prepared in cooperation with Colorado Univ., Boulder (For primary document see N82-31163 21-89)
(Grants NAG5-82; NGL-06-003-057; NAG5-199)
Avail: NTIS HC A99/MF A01 CSCL 03A

The atmospheric structure and energy balance phenomena associated with magnetic fields in the Sun are reviewed and it is shown that similar phenomena occur in cool stars. The evidence for the weakening or disappearance of transition regions and coronae is discussed together with the appearance of extended cool chromospheres with large mass loss, near V-R = 0.80 in the H-R diagram. Like the solar atmosphere, these atmospheres are not homogeneous and there is considerable evidence for plage regions with bright TR emission lines that overlie dark (presumably magnetic) star spots. The IUE observations are providing important information on the energy balance in these atmospheres that should guide theoretical calculations of the nonradiative heating rate. Recent high dispersion spectra are providing unique information concerning which components of close binary systems are the dominant contributors to the observed emission. A recent unanticipated discovery is that the transition lines are redshifted (an antiwind) in DRa (G2 Ib) and perhaps other stars. Finally, the G and K giants and supergiants are classified into three groups depending on whether their atmospheres are dominated by closed magnetic flux tubes, open field geometries, or a predominately open geometry with a few closed flux tubes embedded. M.G.

N82-31166*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

IUE OBSERVATIONS OF SOLAR SYSTEM OBJECTS AND PROCESSES

Robert M. Nelson *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 33-45 refs (For primary document see N82-31163 21-89)
(Contract NAS-700)
Avail: NTIS HC A99/MF A01 CSCL 03A

International Ultraviolet Explorer (IUE) observations of the planets and their satellites, comets, and asteroids are discussed. The use of IUE to identify previously undetected absorption features in planetary atmospheres and magnetospheres, and identify and map the distribution of constituents on the surfaces of solid bodies are covered. The advantages of the IUE over fly-by missions are outlined. M.G.

N82-31167*# California Inst. of Tech., Pasadena.

THE IMPACT OF IUE OBSERVATIONS ON OUR KNOWLEDGE ABOUT GALAXIES AND QUASARS

J. B. Oke *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 46-53 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Observations of extragalactic objects with IUE are discussed. Elliptical galaxies show the presence of very hot stars which are probably highly evolved horizontal branch objects, although the observations are not adequate to rule out young OB stars. Spiral and irregular galaxies often show evidence of young OB stars although the nucleus of M31 is very similar to elliptical galaxies. Several narrow emission line galaxies appear to have nonthermal continua. Observations of Seyfert galaxies permit detailed studies of the continua and line ratios such as L alpha to H beta to be made. Unlike quasars, there is evidence for dust based on the 2175 A feature. The problem of understanding Seyfert galaxy spectra is no easier than that for quasars although observed variability in the broad lines may present useful clues. Observations of high redshift quasars with IUE allow spectra to be obtained down to rest wavelengths of a few hundred Angstroms and provide information about the amount of ionizing flux. Observations of low redshift quasars can be used to test whether the myriads of absorption lines seen below L alpha in high redshift quasars are indeed produced by intergalactic clouds and halos of intervening galaxies. M.G.

N82-31168*# California Univ., Los Angeles. Dept. of Astronomy.

ABUNDANCE FLUCTUATIONS IN THE INTERSTELLAR MEDIUM

Michael Jura *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 54-60 refs Sponsored by NASA and NSF (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The determination of abundances within the interstellar medium is reviewed. It appears that interstellar abundances within 1 kpc of the Sun are uniform to within a factor of two or three, but it is not yet possible to determine whether there are real fluctuations at this level except for deuterium for which the factor of two variations appear to be real. Establishing the level of local fluctuations in the abundances is of considerable importance for understanding the history of nucleosynthesis in the solar neighborhood, the evolution of the interstellar medium and the formation of stars. M.G.

N82-31169*# Colorado Univ., Boulder. Lab. for Atmospheric and Space Physics.

AN ULTRAVIOLET VIEW OF Be STARS

Theodore P. Snow *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 61-67 refs (For primary document see N82-31163 21-89)

(Grant NsG-5300)

Avail: NTIS HC A99/MF A01 CSCL 03A

Several types of ultraviolet observations of Be stars are briefly summarized, with a view towards identifying the characteristics, if any, that distinguish Be stars from other early type objects. The present weight of the evidence is that, from the point of view of ultraviolet data, Be stars are nearly indistinguishable from normal B stars. Both groups have similar characteristics, with differences only in degree. Further comparative studies of Be and nonBe stars have the potential to reveal the causes of the Be phenomenon, and possibly also the origins of winds in early type stars. Several areas for future ultraviolet research are suggested. M.G.

N82-31170*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ULTRAVIOLET OBSERVATIONS OF INTERSTELLAR DUST

Ralph C. Bohlin *In its* Advan. in Ultraviolet Astron. 1982 p 68-79 refs (For primary document see N82-31163 21-89)

Avail: NTIS HC A99/MF A01 CSCL 03A

A large fraction of astronomical observations in the UV are affected by extinction due to interstellar dust in the line of sight. The shape of the extinction curve varies markedly around the sky, especially in regions of nebulosity such as the Orion Nebula. The variations of the shape provide clues to the nature of the dust. Additional insight into the physical properties of dust can be obtained from reflected UV starlight as observed in NGC7023 by IUE and in the faint arms of M101 as photographed by a sounding rocket. Author

N82-31171*# Princeton Univ. Observatory, N. J.

MORPHOLOGY OF GASEOUS HALOS OF GALAXIES

Donald G. York *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 80-88 refs (For primary document see N82-31163 21-89)

(Contract NAS5-23576; Grants NAGW-10; NAG5-48)

Avail: NTIS HC A99/MF A01 CSCL 03A

Recent ultraviolet and optical observations of high latitude gas are reviewed. Hydrogen 21 cm observations of high latitude gas and extended disks of spiral galaxies are used to formulate a picture of the gaseous halo which may be relevant to the origin of quasi stellar object absorption lines. Author

N82-31172*# Astronomical Observatory, Trieste (Italy).

IUE OBSERVATIONS OF SYMBIOTIC STARS

M. Hack *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 89-101 refs (For primary document see N82-31163 21-89)

Avail: NTIS HC A99/MF A01 CSCL 03A

The main photometric and spectroscopic characteristics in the ultraviolet and visual range of the most extensively studied symbiotic stars are reviewed. The main data obtained with IUE concern: (1) the determination of the shape of the UV continuum, which, in some cases, proves without doubt the presence of a hot companion; and the determination of the interstellar extinction by means of the lambda 2200 feature; (2) the measurement of emission lines, which enables us to derive the electron temperature and density of the circumstellar envelope, and, taken together with those lines observed in the visual, give more complete information on which spectroscopic mechanisms operate in the envelope; (3) the observation of absorption lines in the UV, which are present in just a few cases. Author

N82-31173*# Lehigh Univ., Bethlehem, Pa. Div. of Astronomy.

IUE SPECTROSCOPIC INVESTIGATION OF INTERACTING BINARY SYSTEMS

George E. McCluskey, Jr. *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 102-113 refs Sponsored in part by NASA (For primary document see N82-31163 21-89)

Avail: NTIS HC A99/MF A01 CSCL 03A

The IUE observations of binaries consisting of at least one early type star, to the Algol systems, and to W Serpentis systems are discussed. The OB close binaries almost invaribly show a stellar wind. The difference between an unevolved early type system and a slightly evolved system is difficult to discern observationally and probably not meaningful in terms of Roche lobes. the zeta Aur stars show complex gas motions and shocks. Many of the Algol systems show peculiarities in their ultraviolet continua and the resonance lines, particularly Si IV, are of abnormal and variable strength. Emission lines were detected in several systems during the total eclipse. The W Ser stars are characterized by numerous strong emission lines in their ultraviolet spectra. It appears that these systems may be related to beta Lyrae as they seem to be in a phase of rapid mass transfer and their spectra show similarities to that of beta Lyrae. M.G.

N82-31174*# Texas Univ., Austin. Dept. of Astronomy.

BINARY STARS: MASS TRANSFER AND CHEMICAL COMPOSITION

David L. Lambert *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 114-124 refs (For primary document see N82-31163 21-89)

(Contracts NsG-5379; NAS8-32905; Grant NSF AST-81-17485)

Avail: NTIS HC A99/MF A01 CSCL 03A

It is noted that mass exchange (and mass loss) within a binary system should produce observable changes in the surface chemical composition of both the mass losing and mass gaining stars as a stellar interior exposed to nucleosyntheses is uncovered. Three topics relating mass exchange and/or mass loss to nucleosynthesis are sketched: the chemical composition of Algol systems; the accretion disk of a cataclysmic variable fed by mass from a dwarf secondary star; and the hypothesis that classical Ba II giants result from mass transfer from a more evolved companion now present as a white dwarf. M.G.

N82-31175*# Computer Sciences Corp., Silver Spring, Md. Astronomy Dept.

THE DISTRIBUTION OF INTERSTELLAR GAS WITHIN 50PC OF THE SUN

Frederick C. Bruhweiler *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 125-133 refs (For primary document see N82-31163 21-89)

Avail: NTIS HC A99/MF A01 CSCL 03A

Previous Copernicus determinations of H I column densities in nearby stars are reviewed. These results are compared with recent ultraviolet (IUE) data and data acquired at other wavelengths. From this combined data set a coherent picture for the distribution of neutral hydrogen within 50pc of the Sun emerges. For directions away from the galactic center, the total H I column density for a 50pc line of sight is typically approximately 10 to the 18th power/sq cm, while toward the galactic center it may be 1 to 2 x 10 to the 19th power/sq cm or higher. A tentative model is proposed which suggests that the bulk of the H I resides in a cloud in a direction toward L(II) approximately 0 deg. The data are consistent with the Sun being embedded, but near the edge of the cloud. M.G.

N82-31176*# Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass.

IUE AND EINSTEIN OBSERVATIONS OF NGC5204

G. Fabbiano and N. Panagia (Istituto di Radioastronomia del CNR) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 145-150 refs (For primary document see N82-31163 21-89)

Avail: NTIS HC A99/MF A01 CSCL 03A

The use of both the Einstein and IUE observations of NGC5204 to test some of the hypotheses put forward as a result of an X-ray survey of blue peculiar late type galaxies is discussed. In particular the hypothesis that binary X-ray sources of Pop I progenitors are responsible for most of the X-ray emission, is strengthened by the IUE short wavelength spectrum of NGC5204. This spectrum suggests a number of OB stars in agreement with the inferred from the X-ray luminosity. It also shows an ultraviolet excess in agreement with the large X-ray to blue flux ratio. M.G.

N82-31177*# Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass.
MARKARIAN 36: A YOUNG GALAXY
John Huchra, Margaret Geller, Diedre Hunter (Illinois Univ., Urbana-Champaign), and Jay Gallagher (Illinois Univ., Urbana-Champaign) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 151-155 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The UV, optical, and IR observations of three galaxies (NGC 4214, NGC4670 = Haro 9, and Markarian 36) are reported. The optical spectrum of Markarian 36, a dwarf galaxy, is dominated by strong emission lines. The UV spectrum however shows no strong emission lines, only weak C IV and Si absorption and a strong blue continuum that is still rising shortward of Lyman alpha. Combined UV, optical and IR observations show that the continuum is nearly Rayleigh-Jeans from 1100 A to 2.2 microns, with a slight excess in the optical due to free-free emission and recombination lines. This galaxy has few, if any, red stars. Combined with its low metal content, this lack of red stars is a very strong indication that this galaxy has only recently begun to form stars. M.G.

N82-31178*# European Space Agency, Madrid (Spain). Satellite Tracking Station.
FOUR YEARS OF IUE RESEARCH ON CLUMPY IRREGULAR GALAXIES
P. Benvenuti, C. Casini (Istituti di Astronomia e di Fisica), and J. Heidmann (Observatoire de Paris) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 156-159 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

During the first four years of IUE operations seven shifts were used to observe 4 clumpy irregular galaxies: Markarian 7, 8, 297, and 325. All spectra were obtained at low resolution in both short and long wavelength, with exposure time ranging from half to a full shift. The IUE spectra of clumpy irregular galaxies show that the clumps contain a very large number of early O and B type stars, with a large number of supergiants with respect to the main sequence stars. Possibly Wolf-Rayet stars and massive objects of the type of R 136a could also contribute to the clump luminosity. On the average, each clump radiates in the UV 100 times more than 30 Dor. On the other end the liner dimension of a clump is not much larger than the one of 30 Dor. M.G.

N82-31179*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A COMPARISON OF THE EMISSION LINE PROPERTIES BETWEEN QUASARS AND TYPE 1 SEYFERT GALAXIES
Chi-Chao Wu (Computer Sciences Corp.), Albert Boggess, and Theodore R. Gull *In its* Advan. in Ultraviolet Astron. 1982 p 160-164 refs (For primary document see N82-31163 21-89)
(Contract NAS5-25774)
Avail: NTIS HC A99/MF A01 CSCL 03A

For quasars and Seyfert galaxies, the equivalent width of C IV lambda 1550 increases as the continuum luminosity of an object decreases. A reasonable interpretation is that the covering factor increases as luminosity decreases. This is consistent with the fact that the L alpha and C IV equivalent widths for Seyferts are a factor of 2 larger than those for high redshift quasars. The C IV/C III] ratio, which is a sensitive indicator of the ionization parameter, is about 5 for many Seyferts while it is about 2 for high redshift quasars. M.G.

N82-31180*# European Space Agency, Madrid (Spain).
COORDINATED OBSERVATIONS OF SEYFERT I GALAXIES
W. Wamsteker, P. Benvenuti, C. Cacciari, A. Cassatella, L. Bianchi, P. Patriarchi, J. Blades (IUE Observatory), and A. C. Danks (La Silla Observatory) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 165-168 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

A program to obtain simultaneous observations from the X-ray to the IR of Seyfert I galaxies is outlines. Of particular interest is the variability of these Seyfert nuclei. The continuum flux distribution in the UV for AkN 120 and ESO 113-IG45 (F-9) is examined. M.G.

N82-31181*# Bowling Green State Univ., Ohio. Dept. of Physics and Astronomy.
TIME VARIATIONS IN C IV LAMBDA 1550 AND LY ALPHA EMISSION LINES IN NGC5548
Roger Ptak and Ronald Stoner *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 170-176 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Two short-wavelength images of NGC5548 were obtained and separated by a three month interval. Combining this data with that obtained by Wu et al. One year prior to the first image, time variations were discovered in the C IV lambda 1550 and Ly alpha profiles as well as in the intensity ratio. In the image obtained in November 1980, the C IV profile is essentially the same as that of WU et al. However, the November Ly alpha profile is substantially narrower and the Ly alpha to C IV intensity ratio is reduced by roughly a factor of 2. In our February, 1981 image, the C IV profile is narrowed by approximately a factor of 2 compared with the other two observations, while the Ly alpha profile and Ly alpha to C IV ratio is essentially the same as in November. Also a short-wavelength image of the very bright Seyfert galaxy Fairall 9 were obtained an it was found that the C IV and Ly alpha lines in this object have essentially identical profiles. M.G.

N82-31182*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPECTROSCOPY OF TWO BL LACERTAE OBJECTS
C. M. Urry, S. Holt, Y. Kondo, R. F. Mushotzky, K. R. H. Hackney (Western Kentucky Univ.), and R. L. Hackney (Western Kentucky Univ.) *In its* Advan. in Ultraviolet Astron. 1982 p 177-180 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

As part of a continuing program of observations of Bl Lac objects, the IUE cameras were used to look at PKS 0548-322 and PKS 2155-304. The spectra obtained are well described by power laws with alpha approximately 0.8 in each case. For each object, one set of simultaneous X-ray data was obtained using the solid state spectrometer (SSS) on the Einstein Observatory. These data show that the power law extends from ultraviolet frequencies into the X-ray regime, although it steepens slightly for PKS 2155-304. Both objects are variable in the ultraviolet and/or X-ray; in neither case does the small spectral variability appear to correlate with the intensity variability. The overall spectrum of these objects is interpreted in light of a synchrotron self-Compton model with relativistic beaming. M.G.

N82-31183*# California Univ., San Diego. Center for Astrophysics and Space Sciences.
IUE OBSERVATIONS OF FOUR BL LACERTAE-TYPE OBJECTS
D. M. Worrall and F. C. Bruhweiler (Computer Sciences Corp.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 181-184 refs (For primary document see N82-31163 21-89)
(Grant NAG5-63)
Avail: NTIS HC A99/MF A01 CSCL 03A

Spectral fits to IUE observations of four BL Lacertae-type objects are presented. Combined with near-simultaneous measurements at longer wavelengths, positive spectra curvature within the infrared to ultraviolet energy range were found. It is shown that the data provide strong evidence for relativistic beaming in the sources. Lyman alpha emission and possible C IV and N V absorption features in the spectrum of 3C 371 are discussed. M.G.

N82-31184*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COORDINATED OBSERVATIONS OF MARKARIAN 180 AT ULTRAVIOLET, X-RAY, OPTICAL AND RADIO WAVELENGTHS
S. L. Mufson (Indiana Univ.), D. J. Hutter (Indiana Univ.), K. R. H. Hackney (Western Kentucky Univ.), R. L. Hackney (Western Kentucky Univ.), Y. Kondo, R. F. Mushotzky, C. M. Urry, W. Z. Wisniewski (Arizona Univ.), M. F. Aller (Michigan Univ.), H. D.

Aller (Michigan Univ.) et al *In its* Advan. in Ultraviolet Astron. 1982 p 185-188 refs (For primary document see N82-31163 21-89)
(Contracts NAG-8831; NAG5-198)
Avail: NTIS HC A99/MF A01 CSCL 03A

The results of multifrequency observations of MrK 180 = 1133+704, a BL Lac object embedded in a giant elliptical galaxy are presented. The importance of MrK 180 derives mostly from its association of a quasar-like object with a galaxy whose absorption line redshift (z = 0.046) unambiguously determines its distance. This implies that physical conditions within this local quasar can be discussed without the confusion introduced by distance uncertainties. M.G.

N82-31185*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COORDINATED OBSERVATIONS OF MARKARIAN 501 AT ULTRAVIOLET, X-RAY, OPTICAL, AND RADIO WAVELENGTHS
D. J. Hutter (Indiana Univ.), S. L. Mufson (Indiana Univ.), K. R. H. Hackney (Western Kentucky Univ.), R. L. Hackney (Western Kentucky Univ.), Y. Kondo, R. F. Mushotzky, C. M. Urry, W. Z. Wisniewski (Arizona Univ.), M. F. Aller (Michigan Univ.), and H. D. Aller (Michigan Univ.) *In its* Advan. in Ultraviolet Astron. 1982 p 189-192 refs (For primary document see N82-31163 21-89)
(Grants NAG5-198-NAG8-831)
Avail: NTIS HC A99/MF A01 CSCL 03A

The results of multifrequency observations of MrK 501 = B2 1652+39 are presented here. It is a BL Lac object embedded in a giant elliptical galaxy obtained during the period August 1980 - March 1981. It is argued that MrK 501 varies sufficiently slowly at ultraviolet, optical and radio wavelengths on time scales of months that the data are representative of a spectrum obtained at a single epoch. The importance of MrK 501 derives mostly from its association of a quasar-like object with a galaxy whose absorption-line redshift (z = 0.034) unambiguously determines its distance. This implies that physical conditions within this local quasar can be discussed without the confusion introduced by distance uncertainties. B.W.

N82-31186*# Science Research Council, Slough (England).
THE ULTRAVIOLET SPECTRUM OF THE HIGH REDSHIFT BL LAC OBJECT 0215+015
J. C. Blades, M. Pettini (Royal Greenwich Observatory), R. W. Hunstead (Sydney Univ.), and H. S. Murdoch (Sydney Univ.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 193-196 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The highly variable object 0215+015 is studied. It has a range in the optical band of more than 4 magnitudes, and exhibits radidly variable polarization. At optical wavelengths it shows no emission lines but has a rich absorption spectrum with at least six, separate redshift systems. Combined are 3 LWP low-dispersion images of the object to produce a high signal-to-noise spectrum between 2400 - 3200 A which is use to study the hydrogen Lyman lines of the various redshift systems. B.W.

N82-31187*# New York Univ., N. Y. Dept. of Physics.
SIMULTANEOUS MULTIFREQUENCY OBSERVATIONS OF BL LAC OBJECTS AND VIOLENTLY VARIABLE QUASARS
J. N. Bregman, A. E. Glassgold, and P. J. Huggins *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 197-200 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Ultraviolet spectra simultaneous with radio, infrared, optical, and X-ray measurements were obtained for three BL Lac objects and one violently variable quasar during several epochs (0735+178, BL Lac, IZw-187, and 3C446). A feature common to these objects is that the radio-mm continuum must steepen in the far-infrared region in order to connect smoothly to the IR-UV continuum. This indicates that synchrotron emission becomes optically thick in the mm or far-infrared region. The continuum of 3C446 and BL Lac steepen quite rapidly between the IR and UV spectra with slopes near unity. The X-ray emission in BL Lac, 3C446, and 0735+178 has a different origin from the IR-UV radiation, probably from the inverse Compton process. However, the synchrotron radiation is the probable source of X-ray emission in the X-ray bright BL Lac object IZw-187. In IZw-187, most of the energy emerges in the UV - X-ray region, while for the other sources, most of the energy emerges in the far infrared region. Author

N82-31188*# New York Univ., N. Y. Dept. of Physics.
MULTIFREQUENCY OBSERVATIONS OF THE QUASAR 1156+295
A. E. Glassgold, J. N. Bregman, and P. J. Huggins *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 201-204 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The recent outburst in the quasar 1156+295 was discovered in the course of optical monitoring made in preparation for IUE observations in April 1981. Short and long wavelength spectra were obtained on three occasions when the object was very bright, and which were separated in time by intervals of 4 and 60 days. The UV continuum in all cases is a steeply falling power law, with slope close to -2.0. No spectral features are apparent in the UV. Closely simultaneous observations were made by our collaborators at radio, infrared, and optical frequencies. The continuum is less steep at optical and infrared frequencies, and the overall spectra show little change in shape with time. B.W.

N82-31189*# Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass.
X-RAY AND UV SPECTRA OF TWO QUASARS: PKS0637-75 AND PKS1004+13 (4C13.41)
Martin Elvis and G. Fabbiano *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 205-208 refs (For primary document see N82-31163 21-89)
(Contract NAS8-30751)
Avail: NTIS HC A99/MF A01 CSCL 03A

Two quasars, 4C13.41 (1004+13, V approx. 15.2, z = 0.140) and PKS0637-75 (V = 15.75, z = 0.651) were observed in December 1980 with IUE. Both were detected in the short wavelength region. 4C13.41 has the lowest X-ray luminosity/optical luminosity measured in quasars. PKS0637-75 was observed quasi-simultaneously with the Einstein Observatory and a spectrum obtained with the IPC. The UV and soft X-ray spectra have been combined and are discussed together with the optical and infrared data for both objects. B.W.

N82-31190*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.
CHANGES IN THE UV SPECTRUM OF HD 4174
Robert E. Stencel *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 219-222 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

It is noted that the symbiotic-like object HD 4174 (EG And) exhibits the optical spectrum of an M2 giant star, but also shows Balmer and nebular line emission. The first UV spectrum showed an intense far UV emission line spectrum typical of many symbiotic stars. A 470 day binary or pulsation period for this system, based on the changing strength and velocity of the H alpha emission. Preliminary indications are that the H alpha and far UV continuum are eclipsed near phase 0.6 (at maximum H alpha redshift), but that the correlation for the emission lines remains unclear and requires additional observations. B.W.

N82-31191*# Washington Univ., Seattle. Dept. of Astronomy.
ULTRAVIOLET SPECTRA OF HERBIG-HARO OBJECTS AND OF THE ENVIRONMENT OF THE COHEN-SCHWARTZ STAR
K. H. Boehm, E. Boehm-Vitense, and J. A. Cardelli *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 223-226 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Observations in both spectral regions were used in order to determine the continuous energy distribution and the emission line fluxes for H-H 2. The continuous spectrum is similar to that in H-H 1 and F lambda increases rapidly towards shorter wavelengths. This statement is found to be qualitatively correct for all obvious choices of the ultraviolet extinction curve if we use the E(B-V) value determined by the use of the [S II] method.

The origin of the continuum remains enigmatic. The emission line spectrum of H-H 2 shows an even somewhat higher degree of ionization than the spectrum of H-H 1, indicating an even larger discrepancy between ionization information from optical data and that contained in the UV spectra. The immediate environment of the Cohen-Schwartz star emits a continuous spectrum similar to that of a H-H-object but increasing even more steeply towards shorter wavelengths. B.W.

N82-31192*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

SYNOPTIC STUDIES OF CHROMOSPHERIC VARIABILITY IN F - K DWARFS WITH THE IUE

Kenneth L. Hallam, Charles L. Wolff, and James R. Sewall (Applied Research Corp.) *In its* Advan. in Ultraviolet Astron. 1982 p 227-230 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Time-sequential series of IUE spectra for ten F, G and K dwarfs were obtained in 1980 and 1981 to study the rotational dependence of chromospheric flux in the ultraviolet. An interactive computational method using unbiased estimators was developed to measure emission line fluxes free of arbitrary judgement concerning the behavior of the underlying spectrum and shapes of the line profiles. Due to the limited number of observational samples per star, we have used special techniques to analyze the sparsely and anharmonically sampled emission line flux data. Two different autocorrelation measures were computed for each emission line as a function of temporal frequency. Examples and results of this analysis now in progress are given for several stars. Author

N82-31193*# Washington Univ., Seattle. Dept. of Astronomy.

CHROMOSPHERIC, TRANSITION LAYER AND CORONAL EMISSION OF METAL DEFICIENT STARS

Erika Boehm-Vitense *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 231-234 (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

It is shown that while MgII k line emission decreases for metal deficient stars, the Ly alpha emission increases. The sum of chromospheric hydrogen and metallic emission appears to be independent of metal abundances. The total chromospheric energy loss is estimated to be 0.0004 F sub bol. The chromospheric energy input does not seem to decrease for increasing age. The transition layer emission is reduced for metal deficient stars, but it is not known whether the reduction is larger than can be explained by curve of growth effects only. Coronal X-ray emission was measured for 4 metal deficient stars. Within a 12 limit it could still be consistent with the emission of solar abundance stars. B.W.

N82-31194*# Delaware Univ., Newark.

DISCREPANT ASYMMETRY STARS: THE ROLE OF UNSTEADY MAGNETIC FLUX LOOPS IN THE ATMOSPHERES OF LATE-TYPE GIANT STARS

D. J. Mullan and R. E. Stencel (Joint Inst. for Lab. Astrophysics) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 235-238 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

A number of spectroscopic peculiarities of K giants and other stars which lie in a wedge in the HR diagram are discussed. These peculiarities can be understood in terms of unsteady magnetic flux loops emerging into the stellar atmosphere from beneath the surface. B.W.

N82-31195*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

AN IUE SURVEY OF THE HYADES STAR CLUSTER Progress Report

M-C. Zolcinski, L. Kay, S. Antiochos, R. Stern, and A. B. C. Walker *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 239-242 refs Prepared in cooperation with New Hampshire Univ., Durham, and Stanford Univ., Calif. (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

To date 11 of the brightest X-Ray stars (F-K dwarfs) in the Hyades have been observed with the IUE satellite with the short wavelength spectrograph. The IUE results and the X-Ray observations from the Hyades survey with the Einstein Observatory were combined. The differential emission measure function was estimated for each of the 7 stars which showed evidence of emission lines. Constraints on stellar atmospheric parameters (chromospheric pressure, coronal temperature and filling factor were derived. The implications of these results in the context of loop models for the corona and transition region (TR) of these stars are discussed. B.W.

N82-31196*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.

DENSITY SENSITIVE C 2 LINES IN COOL GIANT STARS

Robert E. Stencel and Kenneth G. Carpenter (Ohio State Univ., Columbus) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 243-246 refs (For primary document see N82-31163 21-89)
(Grant NAG5-82)
Avail: NTIS HC A99/MF A01 CSCL 03A

The density sensitivity of the emission lines within the ultraviolet 0.01 multiplet of C II near 2325 A was examined in additional late type giants and supergiants with deep LWR high dispersion exposures. The new data support the original contention based on these lines that noncoronal red giants posses geometrically extended chromospheres. R.J.F.

N82-31197*# Washington Univ., Seattle. Dept. of Astronomy.

CHROMOSPHERIC, TRANSITION LAYER AND X-RAY EMISSION FOR STARS WITH DIFFERENT ROTATIONAL VELOCITIES

Erika Boehm-Vitense *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 247-250 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

In agreement with previous findings for the MgII k line emission in F stars an increase of Lya and transition layer emission with increasing V sub r sin i, if v sub r sin i greater than 30 km/sec. was not found. For V sub r sin i $<$ 30 km/sec., the measured line intensities are consistent with an increase in emission with increasing V sub r sin i. Such a relation between emission and rotation for single stars is also in agreement with X-ray observations. For the young F stars in the Hyades we find generally enhanced emission independently of rotational velocities. The enhancement is most pronounced for low excitation lines. R.J.F.

N82-31198*# Colorado Univ., Boulder. Lab. for Atmospheric and Space Physics.

CAPELLA REVISITED

Thomas R. Ayres *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 251-254 refs (For primary document see N82-31163 21-89)
(Grant NAG5-199)
Avail: NTIS HC A99/MF A01 CSCL 03A

The highlights of two studies of Capella, a spectroscopic binary, undertaken during the third and fourth years of the IUE are given. The first program consists of high dispersion spectroscopy at critical phases of the Capella orbit. The second program is a two month monitoring effort to search for ultraviolet modulations induced by the rotation of magnetic active regions onto and off of the visible hemisphere of the Capella secondary. R.J.F.

N82-31199*# Indiana Univ., Bloomington. Dept. of Astronomy.

THE ULTRAVIOLET SPECTRA OF R AND N TYPE STARS

George T. OBrien and Hollis R. Johnson *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 255-258 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low dispersion long wave radiation spectra of three early N-type carbon stars (BL Orionis, TX Piscium and T Indi) obtained with the IUE are discussed. N-star spectra were compared with IUE observations of late M-type stars and several differences were noted. The Mg II and C II chromospheric emission lines reported are the first convicing detection of a 10,000-20,000 K chromosphere in the N stars. R.J.F.

N82-31200*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.
HIGH DISPERSION FAR ULTRAVIOLET SPECTRA OF COOL STARS
Robert E. Stencel, Jeffrey L. Linsky, Thomas R. Ayres, Carole Jordan (Oxford Univ.), Alexander Brown (Oxford Univ.), and Oddbjorn Engvold (Oslo Univ.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 259-262 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Recent far ultraviolet high dispersion spectra of two cool supergiant stars, Beta Dra (G2 Ib) and Alpha Ori (M2 Iab) are examined in the context of current questions regarding stellar chromospheres, coronae and mass loss. These stars show very different outer atmosphere structure. Beta Dra has a geometrically thin transition region with bright emission lines of 100,000 K plasma that are red-shifted, indicating downflow in magnetic flux tubes. By contrast, Alpha Ori has a cool extended chromosphere and circumstellar envelope with large mass loss. R.J.F.

N82-31201*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
UV EMISSION FROM HE M1 SUPERGIANT TV GEM
A. G. Michalitsianos and M. Kafatos (George Mason Univ.) *In its* Advan. in Ultraviolet Astron. 1982 p 263-267 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low and high dispersion ultraviolet spectra were obtained of the M1 supergiant TV Gem with IUE. Previous IUE observations of this late type supergiant revealed unexpected UV continuum emission, perhaps arising from an early B companion. Low resolution spectra obtained approximately one year apart suggest that the strong Si III in combination perhaps with O I at wavelengths approximately 1300 A varies considerably with time. Large variation in the column density is required to explain these changes. Sporadic mass expulsion with mass loss rates dM/dt approximately 0.00001 solar mass yr minus 1st power from the M supergiant could lead to a dense circumstellar wind near the hot early companion, and thus could account for these observed variations in equivalent width. The high resolution spectrum in the 2000 to 3200 A wavelength range is characterized by narrow absorption lines primarily due to Fe II, Mn II and Mg II (h and k), which are skewed in profile with an extended red wing. This profile structure is tentatively attributed to interstellar absorption and an intervening differentially moving cloud in the direction of Gem OB1, of which TV Gem is a known association member. R.J.F.

N82-31202*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.
ON THE CORRELATION BETWEEN CHROMOSPHERIC AND CORONAL EMISSION
R. Hammer, J. L. Linsky, and F. Endler (Wuerzburg Univ., West Germany) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 268-272 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

It is shown that with increasing stellar activity the emission of the transition region and corona increases faster than the emission of the chromosphere. It is also explained why the pressure of the transition region increases with increasing stellar activity. Further, it is shown that this relation is a necessary requirement for the global stability of the chromosphere/transition region/corona system. R.J.F.

N82-31203*# Hawaii Univ., Honolulu. Inst. for Astronomy.
ULTRAVIOLET OBSERVATIONS OF YELLOW GIANT STARS
Theodore Simon and Jeffrey L. Linsky (Joint Inst. for Lab. Astrophysics) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 273-276 refs (For primary document see N82-31163 21-89)
(Grants NAG5-146; NAG5-82)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low-dispersion spectra of 18 yellow giant stars of spectral types G4-KO were obtained with the short wavelength camera of IUE. Using the emission strength of the C IV 1550 A multiplet as a measure of high temperature 100,000K plasma, we find that the normalized C IV flux is typically 10 to the minus 7th power or smaller, indicating very feeble stellar transition regions. By combining these results with earlier data from IUE, it is shown that there is nearly a two orders of magnitude spread in carbon IV bolometric flux among the yellow giants. Several likely reasons for the observed range in high-temperature emission line strengths are discussed; the more likely appears to be that the majority of the yellow giant stars observed are slow rotators evolving across the Hertzsprung Gap for the second time along a blue loop. R.J.F.

N82-31204*# State Univ. of New York, Stony Brook. Astronomy Program.
SOLAR ANALOGS IN THE 2600 TO 3200 A REGION
Johannes Hardorp, John Caldwell, and Richard Wagener *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 277-280 refs (For primary document see N82-31163 21-89)
(Grant NsG-5250)
Avail: NTIS HC A99/MF A01 CSCL 03A

No criteria for the selection of solar analogs are found. At low dispersion, the spectra of 16 Cyg A, 16 Cyg B, 18 Sco and alpha Cen A look identical to each other and to sunlight reflected from Galilean satellites with the possible exception of Mg II lambda 2800 being stronger in the stars. The use of alpha Cen A or 16 Cyg B as solar substitutes for planetary photometry is expected to be far superior to using published solar irradiances. Author

N82-31205*# Colorado Univ., Boulder. Lab. for Atmospheric and Space Physics.
HIGH DISPERSION IUE SPECTRA OF ACTIVE CHROMOSPHERE G AND K DWARFS
Thomas R. Ayres, Jeffrey L. Linsky (Joint Inst. for Lab. Astrophysics), Alex Brown (Oxford Univ.), Carole Jordan (Oxford Univ.), and Theodore Simon (Hawaii Univ., Honolulu) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 281-284 refs (For primary document see N82-31163 21-89)
(Grants NAG5-199; NAG5-82; NGL-06-003-057; NAG5-146)
Avail: NTIS HC A99/MF A01 CSCL 03A

IUE far ultraviolet echelle spectra of three active chromosphere dwarf stars X1 Orionis (GO V), Bootis A (G8 V), and Eridani (K2 V), are analyzed utilizing spectra of Alpha Cen A (G2 V) and Alpha Cen B (K1 V) as quiet chromosphere comparisons. R.J.F.

N82-31206*# National Aeronautics and Space Administration. Goddard Inst. for Space Studies, New York.
THE RELEVANCE OF THE IUE RESULTS ON YOUNG STARS FOR EARTH'S PALEOATMOSPHERE
V. M. Canuto, J. S. Levine (NASA. Langley Research Center), T. R. Augustsson (NASA. Langley Research Center), C. L. Imhoff (Computer Sciences Corp., Silver Spring, Md.), and M. S. Giampap (Harvard-Smithsonian Center for Astrophysics) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 293-296 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Using the latest IUE results for seven T Tauri stars, which are believed to represent the young Sun and a detailed photochemical chemical model of the paleoatmosphere, the vertical distribution of Oxygen and Ozone in the early atmosphere was calculated. The calculations indicate that the surface Oxygen mixing ratio is as much as six orders of magnitude larger than previously estimated, but appears low enough for the formation of amino acids via the Urey-Miller type of experiments. It is believed that the quantification of the oxygen level in the Earth's paleoatmosphere presented can reconcile the demands of both biological and geological considerations. R.J.F.

N82-31207*# Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.
IUE OBSERVATIONS OF THE JOVIAN HI LYMAN ALPHA EMISSION (1979 - 1982)
T. E. Skinner, S. T. Durrance, P. D. Feldman, and H. W. Moos *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 297-300 refs (For primary document see N82-31163 21-89)
(Grant NsG-5393)
Avail: NTIS HC A99/MF A01 CSCL 03A

Observations of the Jovian H ion Lyman emission made with the IUE observatory beginning in December 1978 just before the time of the Voyager encounters and extending through January 1982 are presented. A constant disk center brightness of about 8 kR is observed for the central meridian longitude range wavelength III approximately equal 200 deg to 360 deg and a variable brightness 9-15 kR is found for the range lambda III approximately 50 deg to 150 deg. These brightness values persisted throughout the three years of observation. The hydrogen bulge near wavelength III approximately equal 100 deg appears to be a permanent feature of the Jovian atmosphere, and no long term change of the planetary Lyman emission is seen. Since the early IUE observations were made near the two Voyager encounters, this indicates that no substantial changes in the atomic hydrogen concentration or the average atmospheric conditions took place between then and now. R.J.F.

N82-31208*# Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.

ULTRAVIOLET SPECTROSCOPY OF THE JOVIAN AND SATURNIAN AURORAS

S. T. Durrance, P. D. Feldman, and H. W. Moos *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 301-306 refs (For primary document see N82-31163 21-89)
(Grant NSG-5393)
Avail: NTIS HC A99/MF A01 CSCL 03A

The results of a series of IUE observations of the north polar aurora obtained during a substantial fraction of one complete rotation of Jupiter are presented. From these data a spectrum of the aurora with high signal to noise ratio, and a resolution of about 8 A was obtained, making possible the identification of many H2 Lyman and Werner bands. The spectrum is of sufficient quality to provide reliable quantative data for a comparison with the model atmosphere calculations. The lack of an observable absorption signature makes it possible to set an upper limit on the column density of CH4 and C2H6 above the auroral emissions and hence an upper limit on the primary particle energies. A comparison of this spectrum with a laboratory spectrum of discharge excited H2 shows a remarkable similarity. The results of several IUE observations of the full disk of Saturn are also examined. The exposures were of approximately 2 hours each, and the H2 Lyman and Werner bands were observed near the north pole in two of them. A.R.H.

N82-31209*# Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.

THE ULTRAVIOLET SPECTRUM OF PERIODIC COMET ENCKE

P. D. Feldman, H. A. Weaver, M. C. Festou (Service d'Aeronomie du CNRS, Verrieres-le-Buisson, France), and H. U. Keller (Max-Planck-Inst fuer Aeronomie, Katlenburg-Lindau, West Germany) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 307-310 refs (For primary document see N82-31163 21-89)
(Grant NSG-5393)
Avail: NTIS HC A99/MF A01 CSCL 03A

A comparison of the ultraviolet spectrum of periodic comet Encke, recorded by the IUE between 1980 October 24 and November 5, with similar spectra of short and long period comets shows the gaseous composition of P/Encke to be virtually identical to that of the other comets. If P/Encke is indeed the remains of a once giant comet, this similarity implies a homogeneous structure for the cometary ice nucleus. The OH brightness distribution shows a spatial variation similar to the visible fan shaped image of the comet. The total derived water production rate is a factor of five higher than that derived from HI Lyman alpha observations during the 1970 apparition and shows a variation with heliocentric distance (r) as r to the -33 power over the range from 0.81 to 1.02 AU. Author

N82-31210*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.

OSCILLATOR STRENGTHS AND COLLISION STRENGTHS FOR SOME IONS OF OXYGEN AND SULPHUR

Y. K. Ho and Ronald J. W. Henry *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 315-317 refs (For primary document see N82-31163 21-89)
(Grant NAGw-48)
Avail: NTIS HC A99/MF A01 CSCL 03A

Collision strengths for electron impact excitation of the O II, O III, S II and S III for some transitions in the ultraviolet of the type ns(sup 2) np(sup q) yields ns np(sup q +1), ns(sup 2) np(sup q) yields ns(sup 2) np(sup q-1) (n+1)s and 3s2 3p(sup q) yields 352 3p(sup q -1) 3d are calculated in a close coupling approximation for an energy rate up to one million K. Configuration interaction target wave functions which give oscillator strengths accurate to 10% for O II and O III, and 20-30% for S II and S III, are used in the expansion. Accurate knowledge of the electron impact excitation cross sections is particularly significant for a proper interpretation of the combined ultraviolet observations of the Voyager UVS and IUE results on properties of the Io plasma torus. Author

N82-31211*# Computer Sciences Corp., El Segundo, Calif.

THE IUE ECHELLE BLAZE FUNCTION

Thomas B. Ake *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 318-321 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

An improved form for the echelle blaze function derived by Ake (1981) was used to study the apparent variation of grating constant K with order m for the long and short wavelength spectrographs. For the LWR camera, early images indicate that K should vary linearly with order. It is suggested that this represents a rotation of the observed blaze centers on the camera compared to a constant K=m lambda line. In four years of use, changes in sensitivity across the camera changed the observed blaze function, inducing a curvature in the K versus m relation. This curvature varies in time with variations in camera response. The SWP camera shows these effects to a lesser degree. Author

N82-31212*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

BIBLIOGRAPHICAL INDEX OF OBJECTS OBSERVED BY IUE

Jaylee M. Mead and Albert Boggess *In its* Advan. in Ultraviolet Astron. 1982 p 322-325 ref (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Six astronomical journals were searched and 343 papers describing studies using data obtained with the International Ultraviolet Explorer satellite were identified. From a review of these papers, the names of the astronomical objects discussed were recorded and compiled into a list of 2460 entries, along with each reference, and sorted by object name or catalogue number. This index enables a user to tell immediately where to find published papers describing IUE observation of the objects of interest to him. Author

N82-31213*# Kansas Univ., Lawrence. Dept. of Physics and Astronomy.

IUE DATA REDUCTION: WAVELENGTH DETERMINATIONS AND LINE IDENTIFICATIONS USING A VAX/750 COMPUTER

J. P. Davidson and D. J. Bord (Benedictine Coll.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 326-330 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

A fully automated, interactive system for determining the wavelengths of features in extracted IUE spectra is described. Wavelengths are recorded from video displays of expanded plots of individual orders using a movable cursor, and then corrected for IUE wavelength scale errors. The estimated accuracy of an individual wavelength in the final tabulation is 0.050 A. Such lists are ideally suited for line identification work using the method of wavelength coincidence statistics (WCS). The results of WCS studies of the ultraviolet spectra of the chemically peculiar (CP) stars iota Coronae Borealis and kappa Camcri. Aside from confirming a number of previously reported aspects of the abundance patterns in these stars, the searches produced some interesting, new discoveries, notably the presence of Hf in the spectrum of kappa Camcri. The implications of this work for theories designed to account for anomalous abundances in chemically peculiar stars are discussed. Author

N82-31214*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FAINT OBJECT STUDIES WITH IUE
Theodore R. Gull *In its* Advan. in Ultraviolet Astron. 1982 p 331-334 (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

To push IUE to the limit on faint sources, detector background contributions from the night sky, energetic particle events, detector flaws and calibration errors must be established. Multiple spectra of faint nebular filaments were intercompared with multiple spectra of sky background in a study of the Crab Nebula. Radiation hits dominate the background of any long exposure spectrum but bright spots of the detector can be misconstrued to be radiation hits, or spectral information. The spectra were normalized and then, on a pixel by pixel basis, average and median spectra were constructed. Four data sets (six SWP nebular, six SWP sky, six LWR nebular, and six LWR sky) were processed in parallel. A number of bright and faint background features remain, especially for SWP images. Several features could be misconstrued to be emission from a faint object. A.R.H.

N82-31215*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPECTRAL ANOMALIES IN LOW DISPERSION SWP IMAGES
Richard L. Hackney (Western Kentucky Univ.), Karen R. H. Hackney (Western Kentucky Univ.), and Yoji Kondo *In its* Advan. in Ultraviolet Astron. 1982 p 335-338 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Physical interpretation of IUE spectra obtained with the SWP camera may be significantly affected by artificial spectral features of several types. In low dispersion large aperture SWP exposures of sources with nominally featureless spectra, a spectral imprint which alters the shape of the continuum, several spurious 'emission features' which recur at fixed locations on the camera target, and fixed pattern noise which can result in illusory emission and absorption features were identified. The anomalies appear in spectra extracted from line by line files generated by IUESIPS at all epochs, regardless of the ITF or rectification scheme used for processing. Author

N82-31216*# Computer Sciences Corp., El Segundo, Calif.
THE PHOTOMETRIC PERFORMANCE OF THE IUE
Albert V. Holm *In* NASA. Goddard Space Flight Center Advan in Ultraviolet Astron. 1982 p 339-342 ref (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The scientific objectives and performance characteristics of a new astronomy mission referred to as the far ultraviolet spectroscopic explorer, or FUSE are being defined by team involving people experienced in instrumentation, observations, and theory in order to develop. mission and instrumental requirements that best meet the scientific needs. The team is intended to have a lifetime of about one year, ending with the submission of a report to NASA which could be used as the basis for an engineering design study. The principal objective of FUSE is to obtain astronomical spectra at wavelengths shorter than is possible with the Space Telescope. A.R.H.

N82-31217*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE FAR ULTRAVIOLET SPECTROSCOPIC EXPLORER
Albert Boggess *In its* Advan. in Ultraviolet Astron. 1982 p 345-346 (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The scientific objectives and performance characteristics of a new astronomy mission referred to as the far ultraviolet spectroscopic explorer, or FUSE are being defined by a team involving people experienced instrumental requirements that best meet the scientific needs. The team is intended to have a lifetime of about one year, ending with the submission of a report to NASA which could be used as the basis for an engineering design study. The principal objective of FUSE is to obtain astronomical spectra at wavelenghths shorter than is possible with the Space Telescope. A.R.H.

N82-31218*# Tuebingen Univ. (West Germany). Astronomiches Inst.
MAGELLAN: HIGH RESOLUTION SPECTROSCOPY AT FUV AND EUV WAVELENGTHS
M. Grewing, S. diSerego Alighieri (ESTEC, Noordwijk), W. Burton (Rutherford and Appleton Lab., Chilton). C. I. Coleman (Marconi Space and Defense Systems, Stanmore), R. Hoekstra (Lab. voor Ruimte-Onderzoek, Utrecht), C. Jamar (Inst. d'Astrophysique, Liege), A. Labeque (Lab. de Physique Stellaire at Planetaire, Verrieres-le-Buisson), C. Laurent (Lab. de Physique Stellaire at Planetaire, Verrieres-le-Buisson), A. Vidal-Madjar (Lab. de Physique Stellaire at Planetaire, Verrieres-le-Buisson), and P. Rafanelli (Osservatorio Astronomico, Padova) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 347-354 ref (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The aim of ESA's MAGELLAN mission is to provide high resolution spectra of celestial sources down to sixteenth magnitude over the extreme ultraviolet wavelength range (between 50 and 140 nm). This range extends from studies of interstellar matter in the disc and halo of this and other galaxies, to stellar envelopes, hot and evolved stars, clusters, intergalactic matter, nuclei of galaxies, quasars, and, finally, planets and satellites. The instrument has a nonconventional optical design using only one reflecting surface; a high groove density concave grating collects the star light, diffracts it and focuses its spectrum into a bidimensional windowless detector operated in a photon counting mode. The slitless configuration provides the spectra of all the sources (point like and extended) in the field of view of the grating. This field of view is limited by a grid collimator to reduce the diffuse background, the stray light and the probability of overlapping spectra in crowded fields. A.R.H.

N82-31219*# Science Research Council, Chilton (England). Rutherford Appleton Lab.
DISTRIBUTION OF GAS IN THE HALO OF THE GALAXY
J. C. Blades, L. L. Cowie (MIT), D. C. Morton (Anglo-Australian Observatory), D. G. York (Princeton Univ.), and C.-C. Wu (Computer Sciences Corp.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 359-362 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Results are presented from a high-resolution, ultraviolet study of interstellar gas situated away from the plane of the Milky Way Galaxy, using the nuclei of Seyfert galaxies Mkn 509 and F9 as background probes. In these directions, low-velocity, galactic gas were detected as well as two extragalactic clouds, one probably associated with the Magellanic Stream and the other with Mkn 509. These data were combined with results from other lines of sight to show that the ultraviolet species extend about 10 kpc from the plane, assuming the high-latitude gas corotates with the galactic disk. Complimentary observations of the optical Ca II and Na I species suggests that these do not extend as far - perhaps 2 to 3 kpc from the plane. Further, the exceedingly complex velocity structure found only in Magellanic Cloud directions suggests that these sight-lines are not typical of high-latitude gas in general. Author

N82-31220*# Royal Greenwich Observatory, Herstmonceux (England).
HIGHLY IONIZED GAS IN THE GALACTIC HALO
Max Pettini and Kym A. West (Univ. College, London, Engl.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 363-368 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The major results are summarized of a study of interstellar absorption in the halo which makes use primarily of IUE observations of a sample of 24 OB stars at z distances between 0.5 and approximately 3 kpc. These data, which cover a wide range of directions, are analysed together with other available results in order to investigate the distribution and physical conditions of highly ionized gas in the halo. A.R.H.

N82-31221*# Warner and Swasey Observatory, Cleveland, Ohio.
SMALL SCALE STRUCTURE IN THE INTERSTELLAR MEDIUM: ORION'S THREADBARE CLOAK
Steven N. Shore *In* NASA. Goddard Space Flight Center Advan.

in Ultraviolet Astron. 1982 p 370-373 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The interstellar medium in the central portion of the Orion Cloak dynamical feature was examined for evidence of fine structure. Four stars in the Ori OB I association, HD 37017, 37468, 37479, and 37776 bracket the stars in the lower belt region that were studied previously. Two are members of the sigma Ori subcluster. A lower limit to the scale inhomogeneity can be set using these at 0.1 pc, while on a scale of about 10 pc, the high velocity component of the second spectrum ions shows optical depth variation of more than a factor of 5. Neutral lines do not display the high velocity component. Some preliminary abundances are also given. Author

N82-31222*# Computer Sciences Corp., El Segundo, Calif. Astronomy Dept.
HIGH DISPERSION OBSERVATIONS OF SELECTED REGIONS IN THE ORION NEBULA
G. O. Boeshaar, C. A. Harvel, A. D. Mallama, P. M. Perry, R. W. Thompson, and B. Turnrose *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 374-379 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

High resolution spectral observations were made of several regions of the Orion Nebula near theta (2) Ori A using the IUE. The positions were selected using a moderate spatial resolution map from a previous low dispersion IUE survery of this section of the nebula. With the SWP and LWR cameras, 28 pectra were obtained of the bright bar, three Taylor-Munch cloudlets, and several surrounding locations. Emission lines of He, C, N, O, Mg, and Si allow a characterization of these cloudlets and of the gas in and around the bar. Small aperture observations provide radial velocity information for the ultraviolet emission of these features. These data show ionization variations from region to region and are suggestive of stellar wind interactions between the cloudlets and theta(2) Ori A. Author

N82-31223*# Royal Greenwich Observatory, Herstmonceux (England).
THE VIOLET INTERSTELLAR MEDIUM ASSOCIATED WITH THE CARINA NEBULA
Max Pettini, Claudine Laurent (Stellaire et Planetaire, France), and Jacques A. Paul (Centre d'Etudes Nucleaires de Saclay, France) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 38-384 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The interstellar spectrum of HD 93205, an 03V star in the cluster Tr16, located inside the most active part of the Great Carina Nebula was analyzed using data extracted directly from raw IUE images. From the analysis of 67 lines of 25 atoms, ions and molecules, up to six discrete absorption components spanning a maximum velocity range of approximately 375 km 5/1 were identified. The component structure for different species is tabulated and sample absorption lines, indicating at the top the positions of the six components, labelled A to F are shown. Ion column densities appropriate to each component which can be resolved in at least one line were derived by constructing empirical curves of growth and by fitting the observations with corresponding theoretical absorption line profiles. The most important results concerning each component are discussed.
A.R.H.

N82-31224*# Rice Univ., Houston, Tex.
CNO ABUNDANCES IN H II REGIONS OF THE MAGELLANIC CLOUDS AND THE GALAXY WITH IMPLICATIONS REGARDING THE NUCLEOSYNTHESIS OF THE CNO ELEMENT GROUP
Reginald J. Dufour and Gregory A. Shields (Texas Univ., Austin) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 385-388 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Final abundance results of IUE observations of the UV spectra of three H II regions in the Small Magellanic Cloud and four H II regions in the Large Magellanic Cloud are presented. Calculated yields of carbon and oxygen derived are y(C)=.00063 and y(O)=.0016. The nucleosynthetic origin of nitrogen was evaluated as being predominantly a secondary element produced from carbon as its seed. Plotting log N/C versus log C/H yielded the rather unexpected result that log N/C decreases with lo C/H over the SMC-LMC-Orion range. The cause of this relationship is discussed. A.R.H.

N82-31225*# Tuebingen Univ. (West Germany). Astronomisches Inst.
THE UV EMISSION LINE SPECTRUM OF NGC 6572
M. Grewing, G. Kraemer, P. R. Preussner, and E. Schulz-Luepertz *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 389-392 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Ultraviolet spectra of the medium excitation planetary nebula NGC 6572 were obtained with IUE both in the low and in the high resolution mode. These spectra reveal a superposition of emission lines arising in the expanding atmosphere of the central star, evidenced e.g., by their P Cygni profiles, and features arising in the planetary nebula proper. The latter were analyzed in order to determine C, N, O abundances. Author

N82-31226*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STRATIFICATION EFFECTS AND IUE SPECTRA OF HIGH EXCITATION PLANETARIES
Walter Feibelman and Lawrence H. Aller (Calif. Univ., Los Angeles) *In its* Advan. in Ultraviolet Astron. 1982 p 393-396 refs (For primary document see N82-31163 21-89)
(Grant NsG-5358)
Avail: NTIS HC A99/MF A01 CSCL 03A

Individual strips across IUE low resolution images of a number of high excitation planetaries with appreciable angular disks (including NGC 2452, 3242, 6818, and IC 1297) are analyzed to assess stratification effects. The familiar enhancement of high excitation lines toward the center is well exhibited, but some unexpected structural features are found in NGC 2452 where C IV shows a single central maximum, but C III, [Ne IV], and He II seem to have a central dip. The new IUE data permit improved chemical composition estimates for several planetaries previously analyzed by Aller and Czyzak. Author

N82-31227*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IUE OBSERVATIONS OF PLANETARY NEBULAE AND THEIR CENTRAL STARS IN THE MAGELLANIC CLOUDS
Stephen P. Maran, Theodore P. Stecher, Theodore R. Gull, Lawrence H. Aller (Calif. Univ., Los Angeles), and Malcolm P. Savedoff (Rochester Univ.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 397-400 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The planetary nebulae LMC P40, SMC N2, and SMC N5 and their central stars were observed with IUE. The C abundances in the nebulae, compared with those in galactic planetaries, indicate that convective dredgeup of locally nucleosynthesized C has occurred. The progenitors of the nebulae were C stars at the theoretical upper luminosity threshold, thus such stars do occur as predicted, although none so bright have been found in the Clouds. The central stars of the nebulae have masses approximately 1 solar mass, luminosities approximately 40, 000 solar luminosity, and radii approximately 0.7 solar radius; they have probably not yet reached their maximum luminosities. With M(subv) 19.1-19.8, they may be the visually faintest stars yet observed by UV spectroscopy. Clearly, it is not true that planetary nebulae nuclei all have masses M = (0.6 + or - 0.1) solar mass. Author

N82-31228*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IUE OBSERVATIONS OF REFLECTION NEBULAE
A. N. Witt (Toledo Univ.), R. C. Bohlin, and T. P. Stecher *In its* Advan. in Ultraviolet Astron. 1982 p 401-404 refs (For primary document see N82-31163 21-89)
(Grants NsG-5388; NsG-7620; NAGw-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low-resolution IUE spectra in the SWP and LWR ranges

were obtained of several reflection nebulae in the vicinity of their respective illuminating stars. Data for NGC 7023 (HD2-00775), NGC 1435 (Merope, 23 Tau), NGC 1432 (Maia, 20 Tau) and the Electra (17 Tau) nebula were found to display significant differences in the shape of their normalized nebular spectra. If the dust in these nebulae is similar from one object to the next, these differences can be most readily explained by differences in the line-of-sight dust distribution, coupled with a wavelength-dependent phase function, changing from a strongly forward throwing form (g = 0.6-0.7) in the visible to a more nearly isotropic shape (g approximately 0.25) at 1400A. Author

N82-31229*# Rochester Univ., N. Y.
IUE OBSERVATIONS OF DUST ALBEDO IN NEBULAE
J. Wolf, H. L. Helfer, J. L. Pipher, and T. L. Herter (Cornell Univ.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 405-408 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The wavelength dependence of the effective albedo of the dust at several positions near the Hourglass region of M8 was determined. Accurate estimates of the contribution of the continuous gas emission can be made using the region 1400A to 1600A. The main uncertainty results from the peculiar extinction of the exciting star, Herschel 36, and the possibility that extinction between the star and the reflecting portions of the nebula exists and needs to be corrected for. The albedo for some planetaries such as NGC 6543 were also investigated. The main uncertainty here is estimating instrumental contributions to the scattering in observing these small objects. Author

N82-31230*# Wisconsin Univ., Madison.
IUE OBSERVATIONS OF LINES OF SIGHT WITH PECULIAR ULTRAVIOLET EXTINCTION
Derck Massa, Edward L. Fitzpatrick, and Blair D. Savage *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 409-412 refs (For primary document see N82-31163 21-89)
(Grant NAG5-186)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low resolution IUE data were used to derive UV extinction curves for a group of stars known to have peculiar extinction parameters from ANS data. The resulting curves have a wide range of appearances. Although the ratio E(BUMP)/E(B-V) differs by a factor of three in the extreme cases, the wavelength of maximum absorption does not appear to change. No evidence for new fine structure in UV extinction was found. The structure near 62 micrometers in the existing mean extinction curves appears to be the result of luminosity mismatch errors. The new extinction curves have shapes that separate into two distinct classes; those associated with clear field extinction and those associated with extinction in dense nebular environments. The range of variation in the curves is so large, the common practice of ironing out the bump can produce enormous errors in the resultant UV energy distributions when E(B-V) > 0.3. Author

N82-31231*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE PECULIAR UV EXTINCTION OF HERSCHEL 36
J. Hecht (Aerospace Corp.), H. L. Helfer, J. Wolf, Bertram Donn, and J. L. Pipher *In its* Advan. in Ultraviolet Astron. 1982 p 413-415 refs Prepared in cooperation with NAS-NRC, Washington, D.C. and Rochester Univ., N.Y. (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The differential extinction curve of Herschel 36 was determined from International Ultraviolet Explorer data. It is quite unusual, characterized by a distinct 2200 A peak with a very low far blue end at 5 to 7 mu to the -1 power. The star appears to be an extreme member of the group Savage drew attention to, previously consisting only of theta Ori, NU Ori, sigma Sco, and rho Oph. It appears that multiple scattering effects are needed to explain the observations. Author

N82-31232*# Colorado Univ., Boulder.
SHORT TERM UV LINE PROFILE VARIATION IN 59 CYG
C. A. Grady, V. Doazan, G. J. Peters, A. Willis, T. P. Snow, D. Aitken, P. K. Barker, C. T. Bolton, H. Henrichs, and C. R. Kitchen *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 425-428 refs (For primary document see N82-31163 21-89)
(Contract NAS5-26409)
Avail: NTIS HC A99/MF A01 CSCL 03A

The International ultraviolet Explorer high dispersion spectra of 59 Cyg obtained as part of the long term monitoring program have shown that noticeable variation can occur in C 5 and N 5 on timescales 3 hours $<t<$ 24 to 28 hours. In order to begin to resolve whether these changes occur continuously or sporadically, 48 hours were devoted to monitoring this star in January 1982. The January spectra show no short term variation, which may be consistent with sporadic rather than continuous variation. Author

N82-31233*# Computer Sciences Corp., El Segundo, Calif.
ULTRAVIOLET SPECTRA OF R CORONAE BOREALIS STARS
Albert V. Holm and Chi-Chao Wu *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 429-432 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

An analysis of the International Ultraviolet Explorer spectra of the R CrB-type variables R CrB, RY Sgr, XX Cam, and MV Sgr suggests that: (1) it should be possible to construct useful models for the atmospheres of these hydrogen deficient, carbon rich stars if present standards of metallic line blanketing are used; and (2) the observed wavelength dependence of the circumstellar extinction is primarily due to circumstellar grains. J.D.

N82-31234*# European Space Agency, Madrid (Spain).
HYDROGEN TWO PHOTON EMISSION IN THE UV SPECTRUM OF TYPE 2 SUPERNOVAE
P. Benvenuti, M. A. Dopita (Mount Stromlo and Siding Spring Observatory), and S. DOdorico (European Southern Observatory, Munich) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 434-437 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The continuum emission of Type 2 supernovae demonstrates an ultraviolet (UV) excess when fit by black body emission is attempted. The H two photon emission is advanced as an explanation of the UV excess. A function by which the UV spectra of two Type 2 supernovae (SN 1979c in NGC 4321 and SN 1980k in NGC 6946) are fitted with U,B,V photometric data is presented. The angular velocity of expansion of the supernovae envelope is derived. From this, the linear velocity of expansion and the distances of the parent galaxies are derived. A distance of 17.3 Mpc is obtained for NGC 4321, and a distance of 7.1 Mpc for NGC 6946. J.D.

N82-31235*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CHROMOSPHERES OF CLASSICAL CEPHEIDS
Edward G. Schmidt and Sidney B. Parsons *In its* Advan. in Ultraviolet Astron. 1982 p 439-441 refs Prepared in cooperation with Nebraska Univ., Lincoln and McDonald Observatory, Austin, Tex. (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The International Ultraviolet Explorer spectra of five classical Cepheids were obtained in the short and the long wavelength regions at low dispersion, curves and emission line strengths were obtained from the low resolution spectra. The amplitudes of the light curves increase with decreasing wavelength except around 1550 A where the amplitude is surprisingly small. The emission line fluxes behave differently in the various stars and it appears that bumps in the ultraviolet light curves are related to the behavior of the chromospheres. However, the strengths of the emission lines are roughly comparable to nonvariable stars of similar temperature and luminosity. The high resolution spectra were used to study the fluxes of the emission from the Mg II h and k lines. It is found that the emission components come and go during the cycles and the behavior differs from one star to another, with generally stronger and more persistent emission at longer periods. This is compared with the times of appearance of the Ca II H and K emission features and provides insight

into the way in which the chromosphere reacts to shock waves generated by the pulsation of the star. Author

N82-31236*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTENSITY CHANGES IN THE UV SPECTRUM OF BETA CEPHEI
Richard P. Fahey, David Fischel, and Warren M. Sparks *In its* Advan. in Ultraviolet Astron. 1982 p 442-445 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Fifty eight short wavelength International Ultraviolet Explorer spectra were taken over a 152 day period. Variations in the absorption lines of C IV (1550 A), Si IV (1393 and 1404 A) and N V (1239 and 1243 A) and a Cr III feature (1208 to 1211 A) were observed. A data reduction technique was developed in order to compare the changes in the equivalent widths of these absorption lines. Periods were determined by least squares fit to a sinusoid using several combinations of the data. In one case eighteen spectra for each ion taken at approximately one day intervals were used; in another, all 58 measurements of each were used; and in a third all measurements from all the ions wee combined. Using both variable metric and interactive algorithms it was determined that for all combinations mentioned a period of 6.10 + or - .06 days is the best fit to the vector of equivalent widths versus time. No other period, with or without the 6.10 day period removed from the data, was found. Analysis of the Cr III feature near 1210 A gives the same period as the others, but in antiphase. Author

N82-31237*# Consiglio Nazionale delle Ricerche, Frascati (Italy).
THE HIGH VELOCITY SYMBIOTIC STAR AG DRACONIS AFTER ITS 1980 OUTBURST
R. Viotti, A. Altamore (Rome Univ.), G. B. Baratta (Osservatorio Astronomico, Rome), A. Cassatella (ESA, Villafranca, Spain), M. Friedjung (Inst. d'Astrophysique, Paris), A. Giangrande, D. Ponz (European Southern Observatory, Munich), and O. Ricciardi *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 446-447 (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

High and low resolution spectra of AG Dra taken in 1981 are analyzed. The UV spectrum of AG Dra is characterized by prominent high ionization emission lines superimposed on a strong continuum. At high resolution, several intense absorption lines of interstellar origin are seen, in spite of the low interstellar extinction. A similar situation is displayed by the high galactic latitude sd0 stars. The radial velocity difference between the emission lines and the i.s. lines is about -105 Km/sec in agreement with the optical observations. The He II 1640 A line appears much stronger than in other symbiotic stars and suggests the presence of a hot source which is variable according to the activity of the star. The line also exhibits broad emission wings which could be formed in a rotating disk. The NV resonance doublet displays a P Cygni profile and is probably formed in a warm wind. Two components in the UV continuum are identified: a steep component dominating the far UV probably associated with the hot source, and a flatter continuum in the near UV which cannot be accounted for by f-f and f-b emission alone, but which is probably emitted by an optically thick region or disk. J.D.

N82-31238*# Wisconsin Univ., Madison. Dept. of Astronomy.
LOW RESOLUTION ULTRAVIOLET AND OPTICAL SPECTROPHOTOMETRY OF SYMBIOTIC STARS
Mark H. Slovak *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 448-451 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low resolution International Ultraviolet Explorer spectra combined with optical spectrophotometry provide absolute flux distributions for seven symbiotic variables from 1200 to 6450 A. For five stars (EG And, BF Cyg, CI Cyg, AG Peg, and Z And) the data are representative of the quiescent/out-of-eclipse energy distributions; for CH Cyg and AX Per, the observations were obtained following their atest outburst in 1977 and 1978, respectively. The de-reddened distributions reveal a remarkable diversity of both line spectra and continua. While the optical and near infrared regions lambda = 5500 A) are well represented by single component stellar models, multicomponent flux distributions are required to reproduce the ultraviolet continua. Author

N82-31239*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OBSERVATIONS AND ANALYSIS OF THE R AQUARII JET
Minas Kafatos and Andrew G. Michalitsianos *In its* Advan. in Ultraviolet Astron. 1982 p 452-455 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Ultraviolet, optical and radio observations of the symbiotic star R Aquarii are discussed in the light of the discovery of a bright radio and optical jet from this star. The star is probably a binary with a period of 44 years. The VLA maps of the jet reveal a protruding structure extending approximately 10 arc sec from the central radio source with a position angle virtually identical to that of the optical jet observed at Lick. The observations of R Aqr are interpreted as indicating the existence of an accretion disk around an unseen companion. The hot subdwarf has effective temperature approximately < 65,000 K. It is suggested that the Mira primary and the hot secondary are in orbit around each other with a high eccentricity. At periastron the hot subdwarf accretes at super critical rates and a jet forms. It is difficult to understand how an accretion disk would have eclipsed the Mira in 1928-1935 and 1974-1980. The suppression of maximum light in these two periods is interpreted as due to a distortion of the Mira envelope at periastron by the tidal interaction with the secondary. The jet may help to explain the excitation of the R Aqr nebula. It is possible that R Aqr flared up as a nova approximately 1000 years ago forming the nebula. J.D.

N82-31240*# Computer Sciences Corp., Greenbelt, Md.
CHROMOSPHERES AND CORONAE IN THE T TAURI STARS
Catherine L. Imhoff and Mark S. Giampapa (Harvard-Smithsonian Center for Astrophysics) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 456-459 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The Tauri stars exhibit strong far ultraviolet emission lines of C II, III, IV; OI; Si II, III; IV; and sometimes N V and He II. Surface fluxes of the lines for several T Tauri stars were computed, drawing upon both International Ultraviolet Explorer observations and published spectra. The surface fluxes are quite high. The FUV lines together account for 0.1% of the stellar luminosity. These results indicate the presence of active relatively dense chromospheres. The Tauri stars showing very strong visual emission spectra exhibit weakened high temperature FUV lines of C IV and N V, as well as He II which may be produced by X-rays. In the same stars, no X-ray emission was detected with Einstein. Among all the T Tauri stars the X-ray luminosities are deficient by factors of 100 to 1000 compared to the FUV lines. It is argued that the X-ray flux has not been heavily absorbed by circumstellar gas, as has been previously suggested, but that the X-rays are truly underluminous, perhaps due to the stellar wind. It is suggested that the birth and development of the chromosphere and corona may be occurring during the T Tauri stage of protostellar evolution. J.D.

N82-31241*# Villanova Univ., Pa. Dept. of Astronomy.
THE NOVA-LIKE VARIABLE KQ MON AND THE NATURE OF THE UX URSA MAJORIS STARS
Edward M. Sion and Edward F. Guinan *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 460-464 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The KQ Mon is a UX UMa type nova-like variable discovered by Howard Bond. Optical spectra taken by Bond in 1978 reveal very shallow Balmer absorption lines and He I absorption. Bond also did UBV and high speed photometry in 1978 and early 1981. There has been no evidence of orbital variations but the appearance of the optical spectrum and the presence of low amplitude flickering suggested a strong similarity to CD-42-14462 (=V3885 Sgr) and other members of the UX UMa class. Low dispersion observations of KQ Mon were made with the

International Ultraviolet Explorer satellite. Six spectra taken with the shot wavelength prime camera are dominated by strong broad absorption lines due to N V, O I, Si III, Si IV, C, IV, He II, N IV, and Al III. There is little evidence of orbital phase modulation over the time baseline of the observations. Unlike UV observations of other UX UMa type objects, KQ Mon exhibits no emission lines or P Cygni type profiles and the velocity displacements appear to be smaller, suggesting the absence of a hot, high velocity wind characterizing other UX UMa stars. The relationship of KQ Mon to other UX UMa disk stars is discussed and a model is suggested to explain their observed properties and the lack of major outbursts. Author

N82-31242*# Villanova Univ., Pa. Dept. of Astronomy.
HIGH VELOCITY GAS OUTFLOW FROM THE NOVA-LIKE VARIABLE LSI 55 DEG -8
Edward F. Guinan and Edward M. Sion *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 465-469 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low and high dispersion International Ultraviolet Explorer observations and measurements of the optical brightness of LSI 55-8 taken on 5 December, 1981 are analyzed. The presence of the C IV resonance doublet showing a variable P Cygni type of profile with a blue shifted absorption component along with the blue shifted absorption features of the high temperature ions indicate the existence of outflowing hot plasma (i.e., a wind). An upper limit of the mass outflow rate was established from the shot wavelength edge of the C IV absorption. The normalized C IV profile is shown o be variable with the largest changes occurring in the relative strength and shape of the emission component. These changes appear to be systematic, and may be associated with the changing projection of the outflowing hot plasma against the disk as a function of orbital motion. LSI 55-8 demonstrates most of the spectral and photometric characteristics exhibited by the nova like, UX UMa type variables, as well as with the dwarf novae in outburst or standstill. The high accretion rate inferred from fitting the Williams theoretical disk model fluxes to IUE data support the hypothesis that LSI 55-8 and related nova like systems are in a state of prolonged outburst. J.D.

N82-31243*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A MODEL FOR THE 1979 OUTBURST OF THE RECURRENT NOVA U SCORPII
Summer Starrfield (Arizona State Univ.), Warren M. Sparks, and R. E. Williams (Arizona Univ.) *In its* Advan. in Ultraviolet Astron. 1982 p 470-473 refs Prepared in cooperation with LASL (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

A series of ultraviolet spectra were obtained of the recurrent nova U Sco during its recent outburst with the IUE satellite. These spectra were analyzed and found to consist primarily of emission lines although broad resonance absorption is present during the first week. These data, in combination with the optical data, show that the nova ejecta is very depleted in hydrogen relative to helium and is rich in nitrogen. An optical spectrum, obtained nine months after the outburst, shows predominantly He II emission lines, indicating that the gas being transferred from the secondary is very helium rich and that the secondary is highly evolved. These data are interpreted to imply that the outburst is associated with the accretion of helium rich material by a massive white dwarf in a close binary system. Neither the observational data nor the theoretical calculations, permit differentiation between a thermonuclear runway or an accretion event as the causc of the outburst. In both cases, an equal amount of material is ejected at equal speeds. J.D.

N82-31244*# Washington Univ., Seattle. Dept. of Astronomy.
CATACLYSMIC VARIABLES: DISK CHARACTERISTICS FROM UV OBSERVATIONS
Paula Szkody *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 474-477 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low dispersion IUE spectra of 3 cataclysmic variables (V442 Oph, V794 Aq1 and H2215-086) are discussed in terms of current disk models. The range of continuum fluxes, line emission and disk parameters of these three novalike systems are compared with past observations of dwarf novae at outburst and quiescence. Evidence of variability on orbital time scales is presented for V442 Oph and H2215-086. Author

N82-31245*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IUE OBSERVATIONS OF THE 1981 OUTBURST OF NOVA CR A
Warren M. Sparks, Sumner Starrfield (Arizona State Univ.), Susan Wyckoff (Arizona State Univ.), Robert E. Williams (Arizona Univ.), James W. Rruran (Illinois Univ.), and Edward P. Ney (Minnesota Univ.) *In its* Advan. in Ultraviolet Astron. 1982 p 478-481 ref (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low dispersion spectrum observations are analyzed. The light curve of nova Cr A, indicating a moderately fast nova, is presented. Flux calibrated, merged spectrum graphs of April 21, 1981 and September 13, 1981 are presented, demonstrating very strong lines of Al and Si. Additional strong C, Ni, O, and Ne emission lines were identified. Emission lines due to highly ionized species such as Mg VII and Al VI were observed for short times in May and June 1981. Preliminary analysis of spectra obtained 200 days after maximum indicate that the nebula is still in transition and has not yet reached the nebula state. An over abundance of N and Ne are suggested. J.D.

N82-31246*# European Space Agency, Madrid (Spain). Satellite Tracking Station.
THE ULTRAVIOLET VARIABILITY OF T Cr B
A. Cassatella, P. Patriarchi, P. L. Selvelli (Astronomical Observatory, Trieste, Italy), L. Bianchi, C. Cacciari, A. Heck, M. Perryman (European Space Technology Center, Netherlands), and W. Wamsteker *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 482-485 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Preliminary results of the ultraviolet variability monitoring of the recurrent nova T Cr B are presented. The star has shown striking changes of the continuum (both shape and integrated luminosity) and of the emission lines since 1979, with a maximum activity in early 1981. In the same period the visual luminosity remained practically constant. The data being studied that the UV variability is due to changes in the physical structure of the accretion disk around the secondary. Author

N82-31247*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
UV OBSERVATIONS OF THE 1981 ECLIPSE OF 32 CYGNI
Robert E. Stencel (Joint Inst. for Lab. Astrophysics), Robert D. Chapman (NASA, Washington, D.C.), Yoji Kondo, and Robert F. Wing (Ohio State Univ.) *In its* Advan. in Ultraviolet Astron. 1982 p 497-500 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Preliminary results of an extensive set of high dispersion UV spectra of the supergiant eclipsing system 32 Cyg are detailed and contrasted with spectroscopic studies of other Zeta Aur systems. Author

N82-31248*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ANALYSIS OF NON-INTERACTING BINARIES WITH LUMINOUS COOL PRIMARIES
Sidney B. Parsons *In its* Advan. in Ultraviolet Astron. 1982 p 501-504 refs Prepared in cooperation with McDonald Observatory, Austin, Tex. (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

High dispersion long wave redundant (LWR) spectra are analyzed for the differential velocity between hot and cool components of heretofore single lined spectroscopic binaries with late type giant or supergiant primaries. Cross correlation of a composite spectrum against early and late type standard stars yields relative velocities with an accuracy of 0.2 to 0.3 kms. When the orbit of the primay is known, the differential

measurement from IUE gives the mass ratio of the system. Low dispersion short wave prime (SWP) and LWR flux spectra are used together with ground-based photometry to disentangle the composite energy distributions of the binaries. Temperatures of both components, their relative luminosities, and the reddening of the system are obtained. Assuming the hot secondaries to be main sequence stars, their probable luminosities and masses may be obtained from their temperatures. Then absolute magnitudes and masses may be obtained for the evolved primaries with more confidence than with existing techniques.
Author

N82-31249*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRE-ECLIPSE ULTRAVIOLET SPECTRA OF EPSILON AURIGAE
Robert D. Chapman, Yoji Kondo, and Robert E. Stencel *In its* Advan. in Ultraviolet Astron. 1982 p 505-508 refs Prepared in cooperation with Joint Inst. for Lab. Astrophysics (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Existing high dispersion, long wavelength IUE, high dispersion long and short wavelength, and Balloon borne ultraviolet stellar spectrograph (BUSS) spectra providing a baseline measurement of the ultraviolet spectrum of the Epsilon Aurigae system before eclipse are reviewed. Plans for ultraviolet spectrum IUE observations during the 1982 to 1984 eclipse of Epsilon Aurigae are presented.
J.D.

N82-31250*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CI CYGNI SINCE THE 1980 ECLIPSE
Robert E. Stencel, A. G. Michalitsianos, and Minas Kafatos *In its* Advan. in Ultraviolet Astron. 1982 p 509-512 refs Prepared in cooperation with Joint Inst. for Lab. Astrophysics and George Mason Univ. (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

During the 1980 eclipse of the 855 day period symbiotic binary CI Cyg, a data set showing high excitation resonance lines which were largely uneclipsed but brightening on an orbital timescale, and intercombination lines exhibiting pronounced but nontotal eclipses and which were fading on an orbital timescale were obtained. A model invoking a low density dissipating nebula surrounding the hot companion to explain the intercombination lines, and a shock between stellar winds to interpret the resonance lines, is described. Subsequent synoptic observations revealed continuing changes in the UV emission line fluxes consistent with those described above, except for the brightening of Mg II and the emergence of strong, not previously seen [Mg V] emission. Post-outburst and phase dependent changes must be included in any interpretation of this system as the archetypal symbiotic binary. Observations to be made during the 1982 October eclipse are summarized.
Author

N82-31251*# Pennsylvania Univ., Philadelphia. Dept. of Astronomy and Astrophysics.
IUE SPECTROSCOPY, VISIBLE-BAND POLARIMETRY, AND RADIOMETRY OF V641 MON
R. H. Koch, B. J. Hrivnak, D. H. Bradstreet, W. Blitzstein, R. J. Pfeiffer (Trenton State Coll.), and P. M. Perry (Computer Science Corp.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 513-516 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

This hot, double line, ellipsoidal variable member of NGC 2264 has been shown previously to be either a semi-detached or contact close binary. Low-resolution IUE spectra are best fitted to a Kurucz model atmosphere for very small (approximately 0.08 mag) E(B-V). The familiar interstellar absorption dip near lambda 2200 is apparently absent. A suitable model atmosphere can be fitted to the IUE fluxes, but flux excesses (compared to the model) appear for all the published U through L magnitudes. The spectrum of the B through L excess appears to follow a .0001 lambda dependence. It is shown that this cannot be interpreted as arising from another star fortuitously observed in the visible band or IR. Ground based polarization measures indicate V641 Mon to be a polarization variable. Previous and new V light curves show the amplitude of light variability itself to be variable by about a factor of 2. It is suggested that all these observed characteristics are best explained by postulating 'third light' and identifying part of it with Rayleigh scattered starlight very near to the stars. From this same region there arise circumstellar absorptions which give rise to nontheoretical strengths for Si II and Si III lines.
Author

N82-31252*# Pennsylvania Univ., Philadelphia. Dept. of Astronomy.
AN ULTRAVIOLET INVESTIGATION OF THE UNUSUAL ECLIPSING BINARY SYSTEM FF AQR
J. D. Dorren, E. F. Guinan, and E. M. Sion *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 577-520 refs Prepared in cooperation with Villanova Univ. (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

A series of seven low dispersion IUE exposures in ultraviolet and wavelength regions obtained on December 6, 1981 during the eclipse of the subdwarf, during egress, and out of eclipse is analyzed. These observations and the binary phase at which they were made are shown on a schematic representation of the V-band light curve obtained in 1975. The depth in V is 0.15 mag. The circles are IUE V magnitudes from FES measures obtained during the observing run. They indicate an eclipse depth some 0.05 mag lower than expected, possibly due to difficulties with the color term in the FES calibration. The eclipse depths of Dworetsky in U, B and V were assumed in the calculations.
J.D.

N82-31253*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LINE-PROFILE AND CONTINUUM VARIATIONS OF THE CONTACT BINARY SV CENTAURI
Jurgen Rahe, Horst Drechsel (Erlangen-Nuremberg Univ.), and Walter Wargau *In its* Advan. in Ultraviolet Astron. 1982 p 521-525 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

A total of five high and ten low dispersion UV spectra of the interacting contact binary SV Centauri obtained between 1979 and 1982 are analyzed. The low resolution observations cover the whole phase range, while a few selected phases were observed in high dispersion. The UV data were complemented with optical photometric and spectroscopic observations, in order to determine the tructure and absolute dimensions of the system. The profiles of prominent UV resonance and metastable lines undergo drastic changes with phase angle and time. Their overall appearance indicates relatively strong mass loss from the system, exhibiting pronounced variations of the stellar wind. The far UV continuum distribution suggests the presence of a luminous hot radiation source with maximum emission in the soft X-ray range, which is most apparently seen during the first quadrature phase, while it is weakest close to primary minimum. The case exchange and mass loss process as well as the evolutionary stage of SV Centauri are discussed.
Author

N82-31254*# University of Southern California, Los Angeles. Dept. of Astronomy.
THE W SERPENTIS BINARIES WITH A FEW WORDS ON EPSILON AURIGAE Progress Report
Mirek J. Plavec *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 526-529 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The Algol systems, U-Cephei and V356 Sagittarii, which should be included among the W Serpentis stars, characterized by strong ultraviolet emission lines are discussed. The spectra of the W-Ser stars are similar to those of the T-Tauri stars, and a similarity of physical conditions is indicated. A model of W-Serpentis, a B-star embedded in a thick disk, may be relevant to other exotic eclipsing systems, possibly even to obliquity of ecliptic Aurigae. The obliquity of ecliptic and the relationship to Aur, BM Orionis is reviewed; the system probably contains a pre main sequence star highly flattened by differential rotation.
E.A.K.

N82-31255*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
A SEARCH FOR CATACLYSMIC BINARIES CONTAINING

STRONGLY MAGNETIC WHITE DWARFS

Howard E. Bond and G. Chanmugam *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 530-533 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The AM Herculis type binaries which contain accreting white dwarfs with surface magnetic fields of a few times 10 to the seventh power gauss were studied. If white dwarfs in cataclysmic binaries have a range of field strengths similar to that among single white dwarfs. AM Her like systems should exist with fields as high as 3 x 10 to the eighth power gauss. It is suggested that such objects will not have the strong optical polarization of the AM Her variables; however, they exhibit high harmonic cyclotron emission, making them spectacular UV sources. We made IUE observations of seven candidate cataclysmic variables selected for optical similarity to AM Her binaries. Although all seven objects were detected in the UV, none display unusually strong UV continua. It is suggested that the distribution of magnetic field strengths among single white dwarfs may be different from that among binaries. E.A.K.

N82-31256*# Princeton Univ. Observatory, N. J.

OBSERVATIONS OF MASS ACCRETION IN BINARY STARS

R. S. Polidan and G. J. Peters (University of Southern California, Los Angeles) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 534-537 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Results from high resolution observations of eight close binary stars (TX UMa, U CrB, CX Dra, TT Hya, AU Mon, KX And, HR 2142, and phi Per) are presented. Variable absorption lines, indicative of mass flow, are observed in all systems expect phi Per. Emission lines are seen in KX And and phi Per. Variable high ionization features (NV, SiIV, and CIV) are seen in TX UMa, UCrB, CX Dra, and AU Mon. The observations are modeled using the calculations of Lubow and Shu. E.A.K.

N82-31257*# University of Southern California, Los Angeles. Dept. of Astronomy.

MODEL FITTING OF THE ALGOL BINARIES

Jan J. Dobias and Mirek J. Plavec *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 538-541 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Energy distribution of the component stars of the Algol type semidetached binaries were studied by combining IUE low dispersion spectra with optical scans made with the same resolution. In most cases the flux distributions are matched by Kuruz model atmospheres with normal solar composition. Deviations from normal atmospheres which indicate a higher level of activity and interaction in the binaries are examined. Eclipse observations in U Cep and V356 Sgr reveal emission lines of the W serpentis type. E.A.K.

N82-31258*# Vanderbilt Univ., Nashville, Tenn.

A RECENT TIME OF MINIMUM FOR AND ATMOSPHERIC-ECLIPSE IN THE ULTRAVIOLET SPECTRUM OF THE WOLF-RAYET ECLIPSING BINARY V444 CYGNI

Joe E. Eaton, A. M. Cherepashchuk (Moscow Univ.), and Kh. F. Khaliullin (Moscow Univ.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 542-545 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The 1200-1900 angstrom region and fine error sensor observations in the optical for V444 Cyg were continuously observed. More than half of a primary minimum and almost a complete secondary minimum were observed. It is found that the time of minimum for the secondary eclipse is consistent with that for primary eclipse, and the ultraviolet times of minimum are consistent with the optical ones. The spectrum shows a considerable amount of phase dependence. The general shaps and depths of the light curves for the FES siginal and the 1565-1900 angstrom continuum are similar to those for the blue continuum. The FES, however, detected an atmospheric eclipse in line absorption at about the phase the NIV absorption was strongest. It is suggested that there is a source of continuum absorption shortward of 1460 angstrom which exists throughout a large part of the extended atmosphere and which, by implication, must redden considerably the ultraviolet continuua of WN stars. A fairly high degree of ionization for the inner part of the WN star a atmosphere is implied. E.A.K.

N82-31259*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.

THE HOT COMPONENTS OF HYDROGEN DEFICIENT BINARIES

J. S. Drilling and D. Schoenberner *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 546-549 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low resolution IUE observations of the hot components of three very similar but peculiar objects: LSS 4300, Upsilon Sgr, and KS Per were compared. The possible evolutionary scenarios from observations and the extremely low hydrogen contents of the visible stars are discussed. It is suggested that the hot secondaries in hydrogen deficient binaries should also be hydrogen deficient. E.A.K.

N82-31260*# University of Southern California, Los Angeles. Dept. of Astronomy.

CONTINUUM AND EMISSION LINES IN ETA LYRAE

Mirek J. Plavec, Janet L. Weiland, and Jan J. Dobias *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 550-553 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Integral photometric characteristics of beta Lyrae were redetermined using its brightest visual companion, the star HD 174664. It was attempted to separate the fluxes coming from the two components. The flux distributions are badly contaminated by the radiation of the circumstellar hydrogen. Peculiarities seem to be present in both components; in particular, the secondary star cannot be represented by an atmosphere with a unique effective temperature, and best represented by a thick disk. E.A.K.

N82-31261*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.

RESULTS OF THE IUE PROGRAM OF MONITORING THE ULTRAVIOLET EMISSION LINE FLUXES OF FOUR BINARY SYSTEMS: HR 1099, 2 PEG, AR LAC AND BY DRA

M. Marstad, J. L. Linsky, T. Simon, M. Rodono (Osservatorio Astrofisico, Catania Italy), C. Blanco (Osservatorio Astrofisico, Catania Italy), S. Catalano (Osservatorio Astrofisico, Catania Italy), E. Marilli (Osservatorio astrofisica, Catania Italy), A. D. Andrews (Armagh Observatory), C. J. Butler (Armagh Observatory), and P. B. Byrne (Armagh Observatory) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 554-557 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

A program to obtain IUE spectra and optical photometry and spectra of three RS CVn-type binaries (HR 1099, II Peg, and AR Lac) and the prototype BY Dra system is reported. The systems were monitored for at least one orbital phase, and periodic variations in emission line flux from II Peg and HR 1099, indicative of notational modulation of an active region on these stars were detected. It is found that for II Peg the active region is in phase with photometric minimum as expected, but for HR 1099 ultraviolet emission maximum occurs at the time of photometric maximum. E.A.K.

N82-31262*# Smithsonian Astrophysical Observatory, Cambridge, Mass.

OBSERVATIONS OF THE MAY 1979 OUTBURST OF CENTAURUS X-4

William P. Blair, John C. Raymand, and Andrea K. Dupree *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 558-562 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The IUE spectra of the X-ray transient/X-ray burst source Cen X-4 at three intervals during the peak and decline of the May 1979 transient event were studied. The spectrum is characterized by a blue continuum and strong emission lines of N V lambda 1240, Si IV lambda 1398 and C IV lambda 1550. The origin of these emission components in the context of an X-ray dwarf nova model is investigated. It is suggested that an

accretion disk plays a prominent role in the generation of the continuum emission and that X-ray heating of the accretion disk and the companion star may be important in the formation of the emission lines. E.A.K.

N82-31263*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE X-RAY BINARY, UW CMa
Sara R. Heap *In its* Advan. in Ultraviolet Astron. 1982 p 562-565 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The UW CMa is a close, eclipsing binary composed of an O7f primary with a stron wind and a less luminous O-type companion. It was found that UW CMa a variable X-ray source, whose X-ray variations are in phase with its optical light curve. Since both components of the binary system are O stars, accretion by a compact object is ruled out as a mechanism for generating X-rays. The UW CMa represents a new class of X-ray binaries, in which X-rays result from the collision of a wind from one star with the surface or wind of the other star. It is hypothesised that the impact of a wind against a star generates a shock wave about 0.25 stellar radii above the stellar surface, and material behind the shock front, heated to bout 10 million degrees, radiates the X-ray apparent X-ray variability is due to its location between the two stars, where it undergoes eclipses. The high temperature region maintains an ionization cavity in the wind, as detected with IUE. The ionization cavity is the source of depletion of absorbing ions in the wind between the two stars. E.A.K.

N82-31264*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.
THE CHROMOSPHERIC ROTATION ACTIVITY RELATION IN LATE TYPE CLOSE BINARY SYSTEMS
Frederick M. Walter, Gibor S. Basri (California Univ., Berkeley), and Robert Laurent (California Univ., Berkeley) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 566-569 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The IUE data on 36 late type close binary stars are presented. It is shown that the chromospheric and TR line fluxes increase with decreasing stellar rotation period, though not as rapidly as does the X-ray flux. There is an increasing dependence upon rotation with increasing line temperature. The data are consistent with the hypothesis that there exists a critical rotation rate, which depends on temperature, below which the emission flux is independent of rotation and above which it increases linearly with increasing angular velocity omega. E.A.K.

N82-31265*# University of Southern California, Los Angeles. Dept. of Astronomy.
MASS LOSS AT DISCRETE VELOCITIES IN Be STARS: EVIDENCE FOR NON-RADIATIVELY DRIVEN WIND
G. P. Peters *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 575-578 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The temporal behavior of the high velocity, relatively narrow absorption components in C IV, Si III, IV observed in the pole-one Be stars psi Ori, 66 Oph, and HR 4009 and what these observations contribute toward our understanding of the Be phenomenon are discussed. Ground based and X-ray data on these stars are compared as well as their UV differences with similarly active Be stars with larger projected rotational velocities. E.A.K.

N82-31266*# Perkins Observatory, Delaware, Ohio.
ULTRAVIOLET SPECTRA OF SOME BRIGHT LATER TYPE Be STARS AND A-F SHELL STARS
Arne Slettebak *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 579-583 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Anomalous ionization (C IV and Si IV is seen in IUE spectra of Be stars as late as B8, and occurs also in standard stars of similar spectral type. Asymmetrical lines suggesting mass loass are present in all the Be stars and several of the standard stars as well, with no obvious correlation with v sin i. Emission shoulders are present in the Mg II lines of two B5e stars but not in Be stars of later type. No correlation is found with v sin i. The A-F shell stars show rich Fe il absorption spectra in the ultraviolet, in one case with velocity structure. E.A.K.

N82-31267*# Observatoire de Paris (France).
EMPIRICAL ATMOSPHERIC VELOCITY PATTERNS FROM COMBINED IUE AND VISUAL OBSERVATIONS: THE Be SIMILAR STARS
V. Doazan, R. Stalio (Observatory of Trieste), and R. N. Thomas (Institut d'Astrophysique, Paris) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 584-588 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The velocity pattern which panspectral observations of the Be stars suggest, and an outline of its extension via similar panspectral observations of the Be similar stars are summarized. The time dependent interaction between the stellar mass flux and the local environment produced jointly by the star itself and its original environment are emphasized. E.A.K.

N82-31268*# University of Western Ontario, London.
MAGNETOSPHERES AND WINDS OF THE HELIUM STRONG STARS: DEPENDENCE ON ROTATION
Paul K. Barker, Douglas N. Brown (Michigan Univ., Dearborn), C. T. Bolton (David Dunlap Observatory), and J. D. Landstreet (University of Western Ontario) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 589-592 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Large aperture, low resolution spectra of 24 stars of types O5, O4, and O3 were obtained, and from these the energy distribution between 1200 and 3200 angstrom was derived in absolute units. The energies were combined with energies deduced from UVBY and UBV photometry and corrected for interstellar extinction. Angular diameters and effective temperatures are also derived. The effective temperatures range from 24800K to 63000K. There is no correlation between effective temperature and spectral type or luminosity class for the early O stars. The size of the expected errors are also studied. E.A.K.

N82-31269*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
UV FLUXES AND EFFECTIVE TEMPERATURES OF EXTREME HELIUM STARS
D. Schoenberner, J. S. Drilling, A. E. Lynas-Gray (University Coll., London England), and U. Heber (Institut fuer Theoretische Physik und Sternwarte) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 593-596 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low resolution IUE spectra of a complete ensemble of extreme helium stars are presented and their appearance in comparison with normal stars is discussed. Effective temperatures from these observations by means of line blanketed model atmospheres are determined. It is found that the temperatures are in accordance with earlier results from ground based observations. E.A.K.

N82-31270*# Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.
ULTRAVIOLET PHOTOMETRY OF A-TYPE STARS AT HIGH GALACTIC LATITUDES
W. B. Landsman, R. C. Henry, and P. D. Feldman *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 597-601 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Ultraviolet photometry on the International Ultraviolet Explorer (IUE) was used to study four stars located in one target of an earlier diffuse background sounding-rocket experiment. The resulting stellar correction is much smaller than that previously estimated, giving a higher diffuse background at this target. Visible photometry appears to be a better indicator of ultraviolet flux than spectral type. The discrepancy between previous predictions and the present observations is explained in terms of: (1) misclassification of two stars; (2) use of a spectral type/effective temperature calibration hotter than more recent determinations; and (3) inadequacy of the Kurucz models, in the far ultraviolet, for A-type stars. E.A.K.

N82-31271*# Warner and Swasey Observatory, Cleveland, Ohio.
THE PECULIAR, LUMINOUS EARLY-TYPE EMISSION LINE STARS OF THE MAGELLANIC CLOUDS: A PRELIMINARY TAXONOMY
Steven N. Shore and N. Sanduleak *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 602-605 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

A sample of some 20 early type emission supergiants in the Magellanic clouds was observed with both the SWP and LWR low resolution mode of IUE. All stars have strong H-emission, some showing P-Cygni structure as well with HeI, HeII, FeII and other ions also showing strong emission. It is found that the stars fall into three distinct groups on the basis of the HeII/HeI and HeI/HI strengths: (1) HeII strong, HeI, HI; (2) HeII absent, HeI, HI strong; (3) HeI absent, HI, FeII, [FeII], strong in addition to low excitation ions. The two most extreme emission line stars found in the Clouds S 134/LMC and S 18/SMC are discussed. Results for the 2200A feature in these supergiants, and evidence for shells around the most luminous stars in the clouds are also described. E.A.K.

N82-31272*# Computer Sciences Corp., El Segundo, Calif.
THE ORION NEBULA STAR CLUSTER
Robert J. Panek *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 606-609 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Photography through filters which suppress nebular light reveal a clustering of faint red stars centered on the Trapezium, this evidences a distinct cluster within the larger OB1 association. Stars within about 20 ft of trapezium comprise the Orion Nebula star cluster are considered. Topics discussed re: (1) extinction by dust grains; (2) photometric peculiarities; (3) spectroscopic peculiarities; (4) young variables; (5) the distribution and motion of gas within the cluster. E.A.K.

N82-31273*# Maryland Univ., College Park.
MASS LOSS FROM THE CENTRAL STAR OF THE PLANETARY NEBULAE IC 3568
J. Patrick Harrington *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 610-614 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Low resolution IUE spectra of IC 3568 show several stellar P Cygni features. A high resolution spectrum was obtained which shows a saturated N V lambda 1240 profile from which we find the terminal velocity of the tellar wind to be v = 1840 km/s. The P Cygni features due to C IV lambda 1549, O V lambda 1371 and N IV lambda 1719 are also observed. The unsaturated O V lambda 1371 line seems best for determination of the mass loss rate. It is found that the level of ionization in the stellar wind appears to increase outwards. The possible effects of such stellar winds from central stars on surrounding nebulae are discussed. E.A.K.

N82-31274*# Consiglio Nazionale delle Ricerche, Milan (Italy). Ist. di Fisica Cosmica.
ON THE VARIABILITY OF LSI+61 DEG 303 (IDENTICAL WITH GT 0236)
E. G. Tanzi, G. F. Bignami, P. A. Caraveo, L. Maraschi, F. Sormani (Millan Univ.), and A. Treves *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 615-618 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

Out of six long and six short wavelength observations, one spectrum exhibits a significant photometric variation: > or approximately 20%. Interpreting the continuum as due to superposition of an early B main sequence star plus a gaseous component contributing at lambda > 2000 A, the wavelength dependence of the variation suggests that it derives from the latter component. The data indicate that if the observed variation is phase dependent, a minimum should occur between phases 0.8 and 0.2. However, since the variation is observed in only one spectrum, it may well be erratic. S.L.

N82-31275*# Wisconsin Univ., Madison.
A SEARCH FOR UV LINE VARIABILITY IN R136a
Dennis C. Ebbets, Blair B. Savage, and Marilyn R. Meade *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 620-624 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

The brightest object in the central cluster of stars in the 30 Doradus nebula is R136a. Optical imaging and ultraviolet spectroscopy show that a luminosity originates in a volume less than 0.1 pc across. A very tight cluster of approximately 30 luminous O and WR stars produces this energy. An alternative interpretation is the possibility that a single supermassive object dominates the light. The visual spectrum is classified as WN 4.5. A common characteristic of WN spectra is variability of the emission lines, especially He II lambda 4686. S.L.

N82-31276*# University Coll., London (England).
ULTRAVIOLET OBSERVATIONS OF NOVA AQUILA, 1982
M. A. J. Snijders, M. J. Seaton, and J. C. Blades (Rutherford Appleton Lab.) *In* NASA. Goddard Space Flight Center Advan. in Ultraviolet Astron. 1982 p 625-628 refs (For primary document see N82-31163 21-89)
Avail: NTIS HC A99/MF A01 CSCL 03A

A bright nova in Aquila was discovered with a visual magnitude of 6 to 7. A number LWR and SWP spectra of the object were obtained with the IUE. The nova has a heavily reddened spectrum, E(B-V)= 0.55 + or - 0.15, and a complex shot wavelength spectrum with both narrow emission features and broad absorption troughs, indicating terminal velocities as high as 10,000 km/s. Both the continuum flux and the absorption line profiles changed between two observations. Short period variations were also observed. S.L.

N82-31277*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A PRELIMINARY ASSESSMENT OF THE SELF-INDUCED ENVIRONMENT AND CONTAMINATION OF THE SPACE TELESCOPE
John J. Scialdone Apr. 1982 31 p refs
(NASA-TM-83936; G-82F0023; NAS 1.15:83936) Avail: NTIS HC A03/MF A01 CSCL 03A

Preliminary estimates for the internal pressures and surface contamination of the Space Telescope were made. The calculations for the transient pressures in the aft-shroud and telescope compartments considered two large communicating volumes that contain gaseous sources and sinks. The outgassing sources in the aft shroud consist of several scientific instruments, paints, insulations, and graphite-epoxy structures. With the exception of the instruments, these sources also exist in the telescope compartment. the outgassing functions were generated from ample test results at various temperatures and from internal pressure measurements in a vacuum test of one of the instruments. The venting occurs through combinations of series and parallel passages in both compartments. The calculated time constant of the two volumes and their respective passages, with the telescope protective door closed, is a few seconds, which is slightly less than that of the shuttle bay volume with the bay doors closed. With the telescope door closed, the pressures in the two compartments should decay to about 10E-5 torr in about 200 hours. The contaminant deposits were assessed on the basis of expected partial pressures of the contaminant fraction of the outgassing. These pressures and the activation energies of the source materials were used to calculate the adsorbed and condensed deposits on the surfaces as a function of time. M.G.

N82-31278# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany).
A TUNABLE INFRARED HETERODYNE RECEIVER FOR ASTRONOMICAL OBSERVATION [EIN DURCHSTIMMBARER INFRAROT-HETERODYN-EMPFAENGER FUER ASTRONOMISCHE BEOBACHTUNGEN]
Dieter Zasche Jan. 1982 125 p refs In GERMAN
(MPI-PAE/Extraterr-173; ISSN-0340-8922) Avail: NTIS HC A06/MF A01

A tunable heterodyne receiver for the medium IR range was built and installed on the Cassegrain focus of an optical telescope. High resolution spectroscopy (wavelength/Delta wavelength > 10 to the 5th power) for IR astronomy was investigated. The

local oscillator of the receiver is a diode laser. Laser and optical input are treated by a common gas through-flow cryostat where the laser temperature is stabilized at Delta T/T < 10 to the -4th power. The noise equivalent power in the 100 MHz optical bandwidth for continuous radiation is 5 X 10 to the -14th power W. The heterodyne receiver was laboratory tested for the determination of molecular constants, e.g., NH3 molecules. Astronomical measurements, using a 187 cm telescope, were made of NH3 line emission by the Jupiter atmosphere. Results show receiver sensitivity to be satisfactory. Author (ESA)

N82-31279# Royal Greenwich Observatory, Herstmonceux (England).
CATALOGUE OF OBSERVATIONS OF OCCULTATIONS OF STARS BY THE MOON FOR THE YEARS 1623 TO 1942 AND SOLAR ECLIPSES FOR THE YEARS 1621 TO 1806
L. V. Morrison, M. R. Lukac (US Naval Observatory), and F. R. Stephenson (Liverpool Univ., England) 1981 54 p refs Microfiche supplement
(ROY-OBS-BULL-186; ISSN-0308-5074) Avail: NTIS HC A04/MF A01; Royal Greenwich Obs., Hertsmonceux, England £6 PHI

Observations and telescope positions of lunar occultations are given. Observations of the times of contact of the limbs of the Sun and Moon during solar eclipses are presented. Author (ESA)

N82-31280# Royal Greenwich Observatory, Herstmonceux (England).
FUNDAMENTAL DATA FOR SOUTHERN STARS (SEVENTH LIST)
R. M. Catchpole, D. S. Evans, D. H. P. Jones, D. L. King, and R. E. Wallis 1982 38 p refs
(ROY-OBS-BULL-188; ISSN-0308-5074) Avail: NTIS HC A03/MF A01; Royal Greenwich Obs., Hertsmonceux, England £5 PHI

Radial velocities, magnitudes and colors of the B-V system are given for 339 stars in the Southern sky including several stars of large parallax. The accuracy attainable with the d camera of the Radcliffe spectrograph after correction for a zenith distance effect is discussed. Radial velocities of stars taken in the zenith are shown to be 2.6 km/sec too slow. A correction which nearly cancels out this discrepancy is presented. Author (ESA)

N82-31281# Royal Greenwich Observatory, Herstmonceux (England).
CATALOGUE OF RADIAL VELOCITIES FROM HERTSMONCEUX AND KOTTAMIA, 1964-1971
R. Woolley, M. J. Pentson, G. A. Harding, W. L. Martin, J. E. Sinclair, C. M. Haslam, S. Aslan, A. Savage (UK Schmidt Telescope Unit), K. Aly (University of Riyadh), and A. S. Asaad (Helwan Observatory) 1981 122 p
(Annals-14; ISSN-0080-4371) Avail: NTIS HC A06/MF A01; Royal Greenwich Obs., Hertmonceux, England £9 PHI

Radial velocities for 1246 stars, obtained from over 3700 spectra taken with spectrographs on the 98 in Newton, 36 in Yapp, 30 in Coude, and 74 in telescope are presented. Standard data, and the formula used for the reduction of radial velocities are given. Values agree with published data, except for 7 stars observed by the 74 in telescope. Author (ESA)

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-31282*# Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.
SUMMARY OF THE WORKSHOP ON ULTRAVIOLET COSMIC BACKGROUND RADIATION
Richard C. Henry 1981 9 p refs Repr. from Ann. N.Y. Acad. Sci., v. 375 p 428-441 Presented at the 10th Texas Symp. on Relativistic Astrophys.
(Grant NGR-21-001-001)
(NASA-CR-169249; NAS 1.26:169249) Avail: NTIS HC A02/MF A01 CSCL 03B

The relationship of the ultraviolet background radiation to the X-ray background is shown. The ultraviolet background, which is four orders of magnitude brighter than the x-ray background, is much less well determined. The relationship of the ultraviolet background to the EUV background and an excellent summary of the discordant ultraviolet observations at high galactic latitudes are given. A picture of the universe from the point of view of those who study ultraviolet background radiation, with emphasis on the various sources of noise that can affect the measurements is presented. The altitudes of various observing platforms are also indicated. S.L.

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-31283 Academy of Sciences (USSR), Moscow. Space Research Inst.
COMETARY PROBE OF THE VENERA-HALLEY MISSION
R. Z. Sagdeev, V. I. Moroz, G. A. Avanesov, B. S. Novikov, A. A. Galeev, and G. A. Skuridin 1982 26 p refs
(Rept-308) Copyright. Avail: Issuing Activity

The cometary probe of the Venera-Halley mission to the planet Venus is discussed. Optical studies of the inner coma (including TV imagery, spectrometry in the region from 1200 A to 12 microns polarimetry) and of the nucleus, measurements of dust fluxes, dust composition, plasma and magnetic field are being prepared. S.L.

N82-31284*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A PHOTOCHEMICAL STUDY OF THE KINETICS OF THE REACTIONS OF NH2 WITH PHOSPHINE, ETHYLENE, AND ACETYLENE USING FLASH PHOTOLYSIS-LASER INDUCED FLUORESCENCE Ph.D. Thesis Catholic Univ. of America
Salvatore Ronald Bosco Jul. 1982 196 p refs
(NASA-TM-83968; NAS 1.15:83968) Avail: NTIS HC A09/MF A01 CSCL 07D

The photochemistry of the reactions of NH2 was investigated in an attempt to explain the existence of an abundance of ammonia in the Jovian atmosphere. The production of ammonia reservoirs from the coupling of ammonia with other atmospheric constituents was considered. The rate constants for the reactions of NH2 radicals with phosphine, acetylene, and ethylene were measured. Flash photolysis was used for the production of NH2 radicals and laser induced fluorescence was employed for radical detection. It was determined that the rates of the reactions were too slow to be significant as a source of ammonia reservoirs in the Jovian atmosphere. J.D.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-31285 Academy of Sciences (USSR), Moscow. Space Research Inst.
DYNAMICS OF SOLAR WIND PLASMA PARAMETERS AND BEHAVIOUR OF MAGNETOSPHERE BOUNDARIES DURING THE ARRIVAL OF INTERPLANETARY SHOCK WAVES TO THE EARTH IN THE EVENTS OF APRIL - MAY 1981
G. N. Zastenker, A. N. Omelchenko, S. I. Klimov, O. L. Vaisberg, M. N. Nozdrachev, Yu. I. Ermolaev, and N. L. Borodkova 1982 32 p Submitted for publication
(Rept-305) Copyright. Avail: Issuing Activity

Features of plasma flow were studied by measurements of the solar wind plasma and low frequency variations of the electric

field on the Prognoz - 8 satllite. The series of interplanetary shock waves was identified in the period of the high solar activity. The velocity and temperature of the solar wind protons and of the alpha particles were determined as the ion density and spectrum of the electric field. Plasma flux oscillations in the range of 2 Hz to 100 Hz were also analyzed. A.R.H.

N82-31286# National Center for Atmospheric Research, Boulder, Colo.
A GUIDE TO THE DATA SYSTEMS OF THE HIGH ALTITUDE OBSERVATORYS CORONAL DYNAMIC PROJECT
Frank Everts Dec. 1981 27 p refs
(Grant NSF ATM-77-23757)
(PB82-165465; NCAR/TN-187) Avail: NTIS HC A03/MF A01 CSCL 03B

The data handling software for the coronal dynamics project's experiment systems is discussed. The system describes the use of HAO's PDP-11/70 computer, the NCAR CRAY-1 and Dicomed systems, and the Comtal image-processing facility toward the goal of reducing the need for C/D data scientific researchers. GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-31287 Academy of Sciences (USSR), Moscow.
LIGHT CURVES CORRELATION ANALYSIS IN RADIO AND OPTICAL RANGES FOR 3C 273 AND 3C 120 EXTRAGALACTIC RADIO SOURCES
B. V. Komberg and V. M. Lyutyj 1982 18 p refs In RUSSIAN; ENGLISH summary
(Rept-705) Copyright. Avail: Issuing Activity

Time delay of radio bursts relative to optical ones are studied by means of correlation analysis of radio and optical light curves for objects with superluminal expansion of radiocomponents: QSS 3C 273 and N-galaxy 3C 120. Parameters (the size and the inclination angle) of compact extragalactic radio sources model in the nuclei of these objects, obtained using the method suggested in Komberg and Lyutyi, and their distances are estimated. It is argued that temporal variation of the parameters is probably connected with nuclei rotation and/or precession with characteristic time about ten years or so. Author

N82-31288 Academy of Sciences (USSR), Moscow. Space Research Inst.
BAYES' APPROACH TO THE ESTIMATION OF GAMMA-BURST DELAY TIME
G. A. Mersov and I. V. Estulin 1982 18 p refs Submitted for publication
(Rept-303) Copyright. Avail: Issuing Activity

To localize gamma-burst sources, the time values of gamma-burst passage between the points where it is recorded in space should be estimated to a high degree of accuracy. To a first approximation, these values are determined as a difference of gamma-burst passage moments. The values may be updated by various methods of the joint processing of the burst recording obtained in different points with a high time resolution. A method based on the determination of posterior probabilities of possible delay values is suggested. These probabilities are calculated by conditional probabilities of the realization of the sequence, whose terms are estimated as the measurement difference obtained in two various points and shifted relative to each other in correspondence with the presupposed delay value of the burst passage. The method was used to process data obtained on the Venera 11 and 12 satellites and on Prognoz 7. Author

N82-31289*# Alabama Univ., Huntsville. Lab. of Cosmic Rays.
INVESTIGATIONS IN COSMIC AND GAMMA RAY ASTRONOMY AND NUCLEAR INSTRUMENTS Final Report, 19 Mar. 1976 - 31 Oct. 1981
John C. Gregory Jun. 1982 39 p refs
(Contract NAS8-31895)
(NASA-CR-162047; NAS 1.26:162047) Avail: NTIS HC A03/MF A01 CSCL 03B

The Nuclear Radiation Monitor (NRM) is flying on the Spacelab 2 vehicle as part of a set of instrumentation designed to measure the ambient physical environment on Spacelab in orbit. The NRM measures the natural and induced gamma ray activity. The instrument is constituted of a 25 sq in (NaI (T1)) crystal viewed with a single phototube and surrounded by a plastic anticoincidence shield. It is mounted on a pedestal and placed, with its electronics, on the Spacelab pallet. The detector head was designed and a development model fabricated and tested. Extensive software studies for on board and GSE microprocessors for use with the NRM were also made. S.L.

N82-31290*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DEVELOPMENTS IN HIGH-PRECISION GAMMA-RAY BURST SOURCE STUDIES
T. L. Cline Jul. 1982 19 p refs Presentd at the COSPAR XXIV, Ottawa, Canada, 19 May 1982
(NASA-TM-83967; NAS 1.15:83967) Avail: NTIS HC A02/MF A01 CSCL 03B

The source location data analyzed by the first and second interplanetary gamma ray burst spacecraft networks are reviewed. The possibilities of additional networks and of related studies in other disciplines, and the prospects for real time optical transient observations and for the definition of gamma ray burst sources by optical transient astronomy are also reviewed. Author

99 GENERAL

N82-31291# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
AERONAUTICAL SYSTEMS TECHNOLOGY NEEDS: ESCAPE, RESCUE AND SURVIVAL, TEST FACILITIES AND TEST EQUIPMENT AND TRAINING/SIMULATION EQUIPMENT Annual Report, CY 1982
Mark A. Moon Feb. 1982 88 p refs Supersedes ASD-TR-82-5001
(AD-A115435; ASD-TR-82-5001-Rev) Avail: NTIS HC A05/MF A01 CSCL 01/3

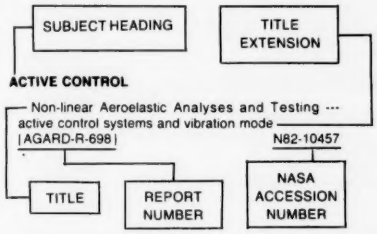
This report is a part of a compilation of formalized Technology Needs (TN) covering Equipment Subsystems as identified in the Aeronautical Systems Division. They are based on development/operational experience, systems studies and new concepts - all related to future system applications. Their presentation is to serve a threefold purpose; i.e., (1) guidance for technology program, (2) prove developmental potential, and (3) engineering data/requirements essential for technology use in systems. The identified needs delineate progress desired in performance, control, design flexibility, safety and cost. Author (GRA)

N82-31292# Office of Naval Research, London (England).
EUROPEAN SCIENTIFIC NOTES, VOLUME 36, NUMBER 4 Monthly Publication, April
Francis A. Richards, ed. and Don J. Peters, ed. 30 Apr. 1982 29 p
(AD-A115525; ESN-36-4) Avail: NTIS HC A03/MF A01 CSCL 05/2

Articles on the behavioral sciences, communication, computers, polar research, material sciences, mathematics, and marine ecology are presented. J. D.

SUBJECT INDEX

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7050).

A

A STARS
Ultraviolet photometry of A-type stars at high galactic latitudes N82-31270

ABORTED MISSIONS
NASA/Rockwell International Space Shuttle Orbiter abort heating test (OH-111)
| AD-A115020 | N82-30326

ABSORBENTS
Tritium storage in molecular sieves
| DE82-003166 | N82-30393

ABSORPTION
Removal of carbon monoxide. Physical adsorption on natural and synthetic zeolites
| NASA-TM-76934 | N82-30765

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BIBLIOGRAPHIES
Aeronautical Engineering. A continuing bibliography (supplement 149) [NASA-SP-7037(149)] N82-30282
Studies on the application of remote sensing by Argentinian organizations [NASA-TM-76897] N82-30583
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Workshop proceedings: Rotor Forgings for Turbines and Generators
[DE81-904198] N82-30560

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[NASA-TM-76912] N82-30433

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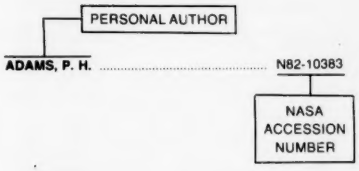

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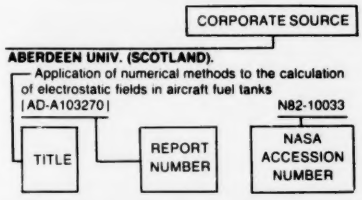

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[EUR-7602-EN] N82-31107

K

KABEL- UND METALLWERKE GUTEHOFFNUNGSHUETTE A.G., HANOVER (WEST GERMANY).
Basic measurements on a multiple heat pipe
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IUE data reduction: Wavelength determinations and line identifications using a VAX/750 computer N82-31213

KARLSRUHE UNIV. (WEST GERMANY).
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KENNEDY (DAVID P.) AND ASSOCIATES, INC., GAINESVILLE, FLA.
Investigation of the current voltage relationship for low barrier Schottky diodes
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KENTRON TECHNICAL CENTER, HAMPTON, VA.
Tensile stress-strain behavior of graphite/epoxy laminates
[NASA-CR-3592] N82-30568

KERNFORSCHUNGSANLAGE, JUELICH (WEST GERMANY).
Investigation of Frenkel defects in nickel and nickel alloys, using diffuse X ray scattering
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Atmospheric concentration of toxic metals in the Federal Republic of Germany: Emission and deposition
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KINETICS TECHNOLOGY INTERNATIONAL G.M.B.H., HAMBURG (WEST GERMANY).
Coal firing of process heaters
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L

LARC ASSOCIATION, TEMPE, ARIZ.
Biofouling countermeasure evaluations for OTEC heat exchangers
[DE82-003918] N82-30896

LEHIGH UNIV., BETHLEHEM, PA.
An optimization technique for the development of two-dimensional steady turbulent boundary layer models
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LIBRARY OF CONGRESS, WASHINGTON, D. C.
Space activities of the United States, Soviet Union, and other launching countries/organizations, 1957 - 1981
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LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Remote sensing of turbine engine gases
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Data report for the Northeast Residential Experiment Station, July 1981
[DE82-001878] N82-30731
The programmable matched filter: A design study
[AD-A115026] N82-30958

LITTLE (ARTHUR D.), INC., CAMBRIDGE, MASS.
Analytical Float Zone Experiments System (AFZES), phase B study, volume 1
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LITTON SYSTEMS, INC., WOODLAND HILLS, CALIF.
Nuclear moment alignment, relaxation and detection mechanisms
[AD-A115203] N82-30302

LOCKHEED ENGINEERING AND MANAGEMENT SERVICES CO., INC., HOUSTON, TEX.
High altitude photography training manual
[PB82-164096] N82-30602
Operational test of panoramic aerial photography for estimating annual mortality of ponderosa pine caused by mountain pine beetle
[PB82-164484] N82-30604
High-altitude radar assessment of the volcanic eruption of Mount St. Helens
[PB82-164468] N82-30605
Photointerpretation key for pine regeneration analysis using high-altitude color infrared panoramic photography
[PB82-164450] N82-30606
High-altitude imagery user guide
[PB82-158353] N82-30608
DISSPLA plotting routines for the G-189A EC/LS computer program
[NASA-CR-167715] N82-30966

LOHER G.M.B.H., RUHSTORF/ROTT (WEST GERMANY).
Monitoring system for big electric motors controlled by microprocessor
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LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Low-temperature chemical-vapor deposition of tungsten from tungsten hexacarbonyl
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LOUISIANA STATE UNIV., BATON ROUGE.
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LUNAR AND PLANETARY INST., HOUSTON, TEX.
A proposal to conduct a Caribbean plate project involving the application of space technology to the study of Caribbean geology
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M

MAN-ACOUSTICS AND NOISE, INC., SEATTLE, WASH.
A study of general aviation community noise impact and annoyance
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MARTIN MARIETTA LABS., BALTIMORE, MD.
Algal culture studies related to a Closed Ecological Life Support System (CELSS)
[NASA-CR-166375] N82-30943

MARYLAND UNIV., COLLEGE PARK.
Nonexistence of smooth electromagnetic fields in nonlinear dielectrics. 2: Shock development in a half-space
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Mass loss from the central star of the planetary nebulae IC 3568 N82-31273

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
The interaction of radio frequency electromagnetic fields with atmospheric water droplets and applications to aircraft ice prevention
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Air/gas system dynamics of fossil-fuel power plants, volume 5. System excitation sources
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[AD-A115047] N82-31063

MATHEMATICAL SCIENCES NORTHWEST, INC., BELLEVUE, WASH.
Reference manual of data sources for load forecasting
[DE82-900319] N82-31059

MAX-PLANCK-INSTITUT FUER PHYSIK UND ASTROPHYSIK, GARCHING (WEST GERMANY).
A tunable infrared heterodyne receiver for astronomical observation
[MPI-PAE/EXTRATERR-173] N82-31278

MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).
On the wall pressure field in turbulent pipe flow
[MPIS-MITT-73] N82-30518
Direct investigation of hydrochloride elimination from 1,2-dichlorethane by laser induced radical chain reactions
[MPIS-21/1981] N82-30550
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Construction of a molecular beam apparatus to measure the integral cross sections of highly vibration excited molecules
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MCDONALD OBSERVATORY, AUSTIN, TEX.
Chromospheres of classical Cepheids N82-31235
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MEDICAL RESEARCH COUNCIL, CAMBRIDGE (ENGLAND).
Cognitive performance, sleep quality and mood during deep oxy-helium diving
[RNP-1/81] N82-30920

METALLGESELLSCHAFT, A.G., FRANKFURT AM MAIN (WEST GERMANY).
Development of industrial production processes for components of solar heating systems, especially solar collectors
[BMFT-FB-T-82-059] N82-30763

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Measurement of sulfate aerosols from western low-rank coal-fired boilers with FGD: Results of tests at Coal Creek Unit 1
[DE82-001123] N82-30769
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MICHIGAN TECHNOLOGICAL UNIV., HOUGHTON.
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Data dependent systems approach to solar energy simulation inputs N82-30653

MICHIGAN UNIV., ANN ARBOR.
A generalized analysis of solar space heating N82-30660

MIDWEST ENERGY INST., KANSAS CITY, MO.
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MIDWEST RESEARCH INST., GOLDEN, COLO.
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MISSION RESEARCH CORP., SANTA BARBARA, CALIF.
Techniques for remote sensing of ionospheric electron density from a spacecraft
[AD-A115398] N82-30785

MITRE CORP., BEDFORD, MASS.
Use of time domain reflectometry for EMP hardness surveillance
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An economic comparison of active solar energy and conventional fuels for water and space heating N82-30662

N

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Effects of natural petroleum seeps
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[PB82-162454] N82-30817
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Aeronautical Engineering. A continuing bibliography (supplement 149)
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[NASA-EP-85] N82-30283
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Influence of the number of vehicles in the emergence of sound events on the annoyance expressed - experimental study
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Removal of carbon monoxide. Physical adsorption on natural and synthetic zeolites
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Effect of restricted mobility on the composition and metabolism of blood lipoproteids in rabbits
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[NASA-TM-76900] N82-30875
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[NASA-TM-76901] N82-30876
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Effect of immobilization stress on diacyl- and plasmalogen-derivatives of phospholipids in various rat organs and tissues
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[NASA-TM-76869] N82-30894
Aeronautical Engineering: A continuing bibliography with indexes
[NASA-SP-7037(148)] N82-30917
Effect of hypokinesia on some red blood indices and the condition of regulatory systems
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RNA accumulation in the body of neurons as an indicator of their functional deafferentation
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD INST. FOR SPACE STUDIES, NEW YORK.
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Documentation of the solar radiation parameterization in the GLAS climate model
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. JOHN F. KENNEDY SPACE CENTER, COCOA BEACH, FLA.
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
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Structures and Dynamics Division research and technology plans, FY 1982
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The role of peel stresses in cyclic debonding
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[NASA-TM-84495] N82-30707
NECAP 4.1: NASA's Energy-Cost Analysis Program input manual
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Energy saving electrical motor control system
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Instrument manual for the retarding ion mass spectrometer on Dynamics Explorer-1
[NASA-TM-82484] N82-30527
Space telescope neutral buoyancy simulations: The first two years
[NASA-TM-82485] N82-30942

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).
Technical assistance telemetry channel coding investigation
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NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
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Non-noble catalysts and catalyst supports for phosphoric acid fuel cells
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[PB82-168980] N82-30821
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
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European Scientific Notes, volume 36, number 4
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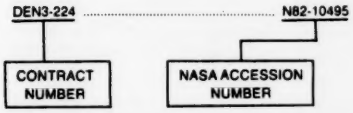

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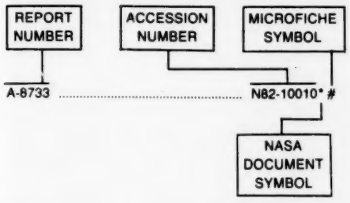

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